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JOURNAL OF THE
INTERNATIONAL
GARDEN CLUB



VOLUME II, 1918

GENTES FLORIBUS INTERTEXTAE

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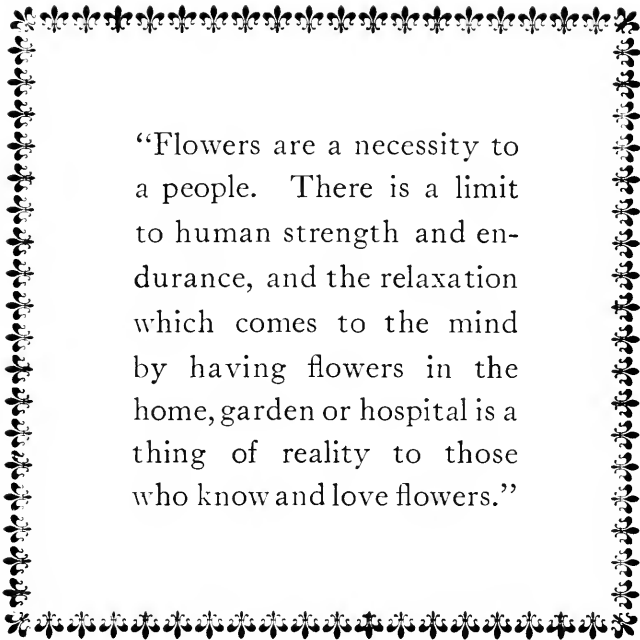
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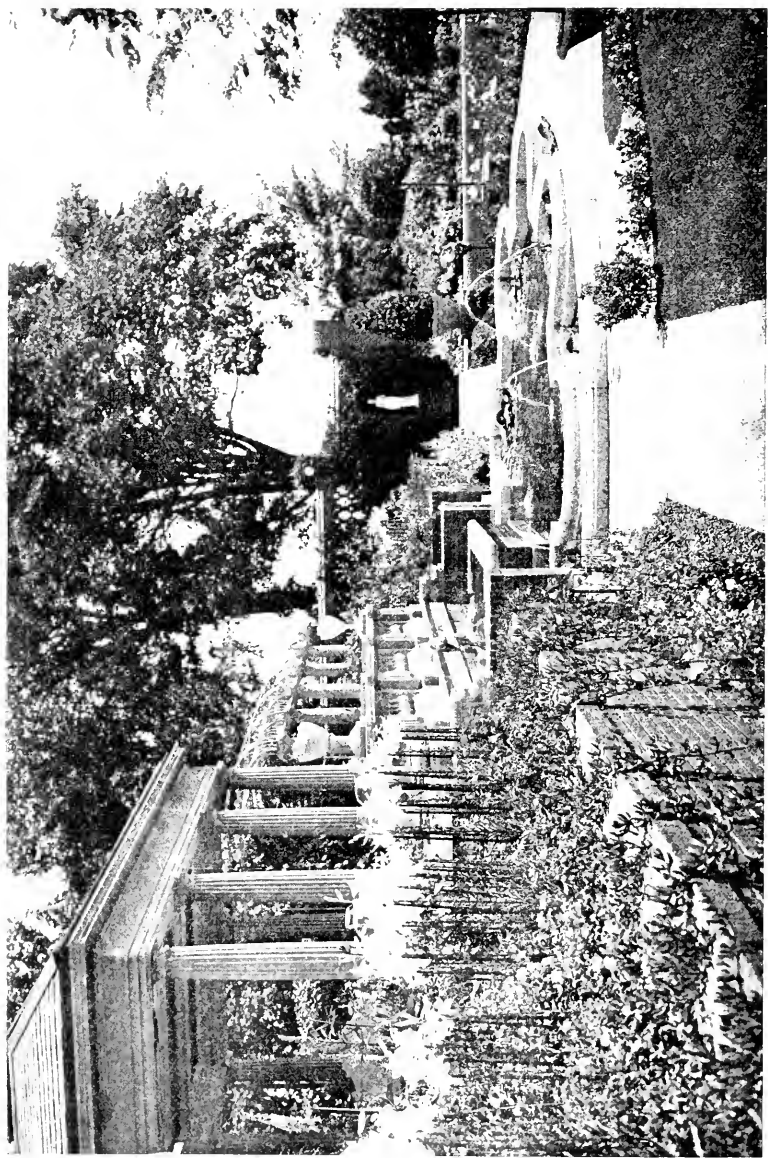
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LILIUM CANDIDUM
THE BEST, BROAD-PETALLED TYPE



“Flowers are a necessity to a people. There is a limit to human strength and endurance, and the relaxation which comes to the mind by having flowers in the home, garden or hospital is a thing of reality to those who know and love flowers.”



LILIUM CANDIDUM FOR PORCH PLANTING

Journal of the

INTERNATIONAL GARDEN CLUB

VOL. II

MARCH, 1918

No. 1

Lilies

By Arthur Herrington



THE white Lily has ever been esteemed as Flora's emblem of purity, but the Lily Family as a whole has not as yet been accorded that popularity and prominent representation in gardens which it rightly deserves.

A chain of beautiful Lilies encircles the Northern Hemisphere from the Pacific Coast eastward across this vast continent, thence through Europe and Asia and ending only in Japan and the Philippines.

The geographical distribution of Lilies is peculiar in that they are only to be found in countries north of the equator. The important fact in regard to them is that the majority of Lilies are hardy enduring flowers, much more so than is popularly supposed. The culture of a few species and varieties of Lilies in vast quantities under glass, the flowering of them in season and out of season, may have diverted our thoughts from the actual possibilities of Lilies as open-air garden flowers.

To succeed with Lilies however we must study their nature and origin and in so far as it is possible try to provide their con-

stitutional requirements. We must try to appreciate that they are children of nature to a much greater degree than the majority of our hardy garden flowers. For example the Roses, Irises, Peonies and Larkspurs that we grow to-day are improved varieties of garden origin, that have been developed under conditions as they exist in gardens, and they have acquired an adaptability to prevailing garden conditions.

Most of the Lilies that we can and should grow in gardens however are not products of the hybridiser, nor improved developments, but wild species, pure and beautiful, true and constant. In our gardens we must try and make our conditions conform to the Lilies' actual needs. They love the sun, but they are greatly benefited by some low ground-cover that will shade and protect their roots from the scorching heat and drought. This fact is perhaps one of the greatest cultural importance. In proof of it let me quote from the writings of Mr. E. H. Wilson, in regard to the conditions under which *Lilium regale* and *L. Henryi* two of China's most important Lilies were seen by him in their distant native home.

Journey in thought with me for a moment to China up the mighty Yangtze River for eighteen hundred miles, then northward, up its tributary the Min, some two hundred and fifty miles to the confines of mysterious Thibet. There in narrow semiarid valleys down which thunder torrents, and encompassed by mountains composed of mudshales and granites whose peaks are clothed with snow eternal, the Regal Lily has its home. In summer the heat is terrific, in the winter the cold is intense, and at all seasons these valleys are subject to sudden and violent windstorms against which neither man nor beast can make headway. There, in June, by the wayside, in rock crevices by the torrent's edge, and high up on the mountain-side and precipice this Lily in full bloom greets the weary wayfarer. Not in twos and threes, but in hundreds, in thousands, aye, in tens of thousands, its slender stems, each 2 feet to 4 feet high, flexible and tense as steel, overtopping the coarse grass and scrub, crowned with one to several large, funnel-shaped flowers more or less wine-colored without, pure white and lustrous on the face, clear canary-yellow within the tube, and each stamen tipped with a golden anther. The air in the cool of the morning and in the evening is laden with soft delicious perfume exhaled from each bloom. For a brief

season this lonely, semi-desert region is transformed by this Lily into a veritable fairyland.

On our homeward journey let us pause for a moment in the geographical heart of China, in the region of the famous Yangtze gorges, and visit the haunt of the orange-flowered *speciosum* (*L. Henryi*). Inland a few miles from the city of Ichang, on formations of conglomerate and carboniferous limestones, at the edge of woods and among tall shrubs we find here a few and there many of Henry's charming Lily. I could tell of others equally beautiful were any good purpose to be served, but I mention these to direct attention to the conditions under which they grow wild, and to emphasize that, though sun-loving and capable of withstanding much desiccation, both from the action of sun and frost, they grow naturally among protective herbs and shrubs. These herbs and shrubs afford protection in two ways: In spring they screen from the sun's direct rays the young flower-stem of the Lily, and after it emerges from mother earth; in the autumn the fallen leaves of the shrubs and the dying culms of the herbs form a protective mulch which as it decays becomes a nourishing food.

A Lily garden is a glorious possibility of easy attainment, with one-half of the world paying tribute of beauty thereto. Out of the abundance of the Lily family we may make selections and suitable plantings that will ensure a complete succession of Lilies blooming from May until September, a changing garden picture unequaled in gorgeous beauty, with the added feature of permanency in succeeding years. The cost is not prohibitive, because the majority of the best garden Lilies are plentiful and cheap, when we consider their permanent character and their subsequent increase in numbers. With a few exceptions, Lilies are grown in ordinary garden soil of average depth and fertility; in fact, many of them need no culture at all, only to be once planted and left alone for a number of years, when they have increased to such an extent as to need lifting and replanting in reduced quantity. Look at our native Lilies, *superbum* of the swamps and *canadense* of the fertile meadows; "they toil not, neither do they spin," but in their season they are pictures of great beauty. These, although natives, are worthy of garden cultivation, and the response to garden culture is seen in greater stature and more abundant blooming.

Planting Lilies

From observations of how and where Lilies grow we find the best guidance in making our Lily plantings.

We should plant colonies of them among the dwarfer shrubs spacing our shrubs more widely so that they would not unduly crowd out the Lilies using for example the dwarfer Deutzias and Spiraeas, also Azaleas and Rhododendrons when these can be planted and grown in a loamy soil free from lime. Lilies and Peonies too make an admirable combination as the abundant spreading leafage of the Peonies gives a good ground shade. When planting Lily bulbs, plant deeply, burying the bulb at least twice its own depth, or in other words, a bulb 3 inches deep should, when planted, have its point or apex 6 inches below the surface of the ground. This is particularly important for those Lilies that have a twofold root system. Certain Lilies in addition to the roots that are emitted from the base of the bulb have a supplemental growth of roots emitted from the stem, and it is apparent that these roots are helpful in promoting strong growth and good flowers. If the bulbs of these stem-rooting kinds are not deeply planted, the stems as they grow will still put out their roots above the surface of the soil and finding no sustenance in the air, the plant is deprived to that extent and weakened thereby. Other Lilies have only the root system that emanates from the base of the bulb and these need not be so deeply planted. As a guide to planters I give a list of those that root from the stem as well as the bulb:—*auratum* in all its varieties, *Batemannæ*, *croceum*, *longiflorum*, *japonicum*, *Hansonii*, *Henryi*, *regale*, *speciosum*, *Thunbergianum*, *tigrinum*. The following Lilies root from the bulb only, *canadense*, *candidum*, *chalcedonicum*, *excelsum* or *testaceum*, *giganteum*, *Martagon* in variety, *superbum*, *Szovitzianum*.

Although these and other facts and peculiarities are matters of record for the guidance of those seeking more light on Lilies, the Lily family has not made great progress under cultivation. This should not, and I confidently believe need not, be so if we study their natural requirements and exercise skill and care in

establishing them. Some failures have resulted from the purchase and planting of bulbs that have been a long time out of the ground and have become much shrivelled and dried out. A Lily bulb being an aggregation of loose scales will dry out and suffer more from prolonged exposure than a bulb of closer formation such as a Hyacinth or Narcissus and it may be that its vitality is at so low an ebb that the chances of its ultimate growth are very slight. A helpful way to establish Lilies in the garden is to grow the bulbs in pots for the first season and they can then be nursed back to health and strength if they have been too long exposed. The flowers, too, might be removed for the first year. By planting bulbs that have been grown and become well rooted in pots they are almost certain to succeed and surely we should spare no effort that is helpful.

If the soil at the depth it is necessary to plant is of a poor inert character it should be entirely removed and proper soil provided. In this respect, again, some have failed. They have been told to plant deeply and have followed the instructions literally by embedding the bulbs deep down in material that would not even induce, much less maintain, growth. Except for a few moisture-loving species, Lilies generally require a well drained soil free from excess of moisture or conditions of stagnation. Careful planters often provide a sand base for the bulbs to be set upon whilst others go even farther and envelop the entire bulb with sand of about one-half inch in thickness.

The nature of the soil one has to deal with determines many details, as for example, one successful grower who had to deal with a heavy moisture-holding soil, found it advantageous when planting to lay the bulbs upon their sides so that an excess of water might not find lodgement in the scales that form the bulb.

Where Lilies are being planted among and in association with trees and shrubs a helpful method is to excavate the spot to the required depth and set a half barrel minus its bottom in the ground with its top level with the surface. Fill with proper soil and plant the bulbs, and the barrel will keep out the roots of marauders till the Lilies are established.

The matter of soil suitability is not a difficult one considering the world-wide distribution of the family and the variety of soil conditions that must naturally exist. Our American Lilies require abundant moisture and peaty soils and a few species from other countries must have special soil preparation. There are a number of good Lilies that one can grow in the ordinary flower bed or border in average good garden soil in association with the best hardy perennial or biennial flowering plants, as for example, *L. candidum*, *L. chalcedonicum*, *L. croceum*, *L. excelsum* or *testaceum*, *L. Henryi*, *L. Martagon* in variety, *L. monadelphum* or *Szovitzianum*, *L. regale*, *L. speciosum*, *L. Thunbergianum* or *elegans* in great variety, *L. tigrinum*, *L. umbellatum* and even this limited number will give us six months of Lily bloom, for their flowering period extends from May to October.

Other Lilies equally desirable must have special treatment to ensure their doing well. If we have the conditions conducive to their welfare the effort to establish them under the conditions is certainly worth while.

Let us pass in brief review some of the Lilies which can be grown in gardens commencing with what is now generally called *Lilium elegans*. This is a dwarf early-flowering Japanese species and has been grown in gardens for a long time. It is also called *L. Thunbergianum* by some growers. The wild type has upright cup-shaped flowers of a reddish color but by color selection and in other ways both Japanese and Dutch growers have improved on the wild type so that we have varieties in varying shades of color from yellow through orange and scarlet to dark crimson. These are at least a dozen of most striking and distinct varieties and they flower most abundantly in May and June. *Lilium umbellatum* also known as *Davuricum* is a near relative to the preceding species, comes from Siberia and has also given rise to distinctive named varieties in shades, from yellow and orange to deep crimson. They are hardy, easily grown and flower in June. *L. croceum* the old Orange Lily of English gardens is a European counterpart of the same type, opening its red gold cups to the shining sun with a bril-

liance delightful to behold. Here is a Lily that will grow anywhere in sun or shade in town or country and never fail each year to send up in June and July its great bloom clusters 3 to 5 feet high.

Candidum, the Madonna Lily

This is probably the oldest known Lily and has been a favorite in gardens from the earliest times. It grows wild in the south of Europe in Palestine and Syria. Though always a joy when seen in all its purity and beauty and amazing profusion of bloom, too often it has been a despair to many by reason of failure to successfully establish it in their gardens, especially when one has seen it grow, and subsist, and flower, year after year under conditions that savored more of neglect than tender care. We know it can stand full exposure to all conditions of climate, as witness the old groups in some gardens where the bulbs have become so matted together as to crowd some of them almost out of the ground, and it enjoys a perfect immunity from disease.

If you would succeed with this Lily first procure healthy bulbs giving the preference to stock that has been imported from England, or if from France, then only from Normandy or Brittany. Next plant early, not later than September and plant the bulbs about 4 inches deep. Bear in mind too, this Lily differs from all other Lilies in that it has a very short period of rest, for immediately after flowering, or in the case of newly planted bulbs, it makes a leaf growth which is evergreen and must be taken care of. Do not over-enrich the soil nor let lime be deficient as it is on the exposed limestone hills that this Lily grows wild.

The disease when it appears must be fought or it will gain the upper hand and decimate your stock. It is a fungus (*Botrytis cinerea*) and first appears in yellowish-brown blotches upon the leaves. If left alone it quickly spreads, denudes the flower-stalks of foliage, and blemished or distorted flowers are the result. Take time by the forelock and spray as soon as

the disease appears with a solution of 1 ounce of sulphide of potassium to $2\frac{1}{2}$ gallons of water. Give a light but thorough spraying daily, not only to the affected Lilies but to all of them, until it is evident that the disease is under control. It can be eliminated and healthy Lilies grown if you will make the effort and persist.

There are bad forms of the Madonna Lily in cultivation, one especially, and which seems to have been plentifully propagated and distributed, the flower having narrow petals making a poor open thin flower. See the first illustration at the beginning of the article. Avoid it if you can. There is a variety called *robustum* which is especially strong and healthy and another named *speciosum* which has black stems.

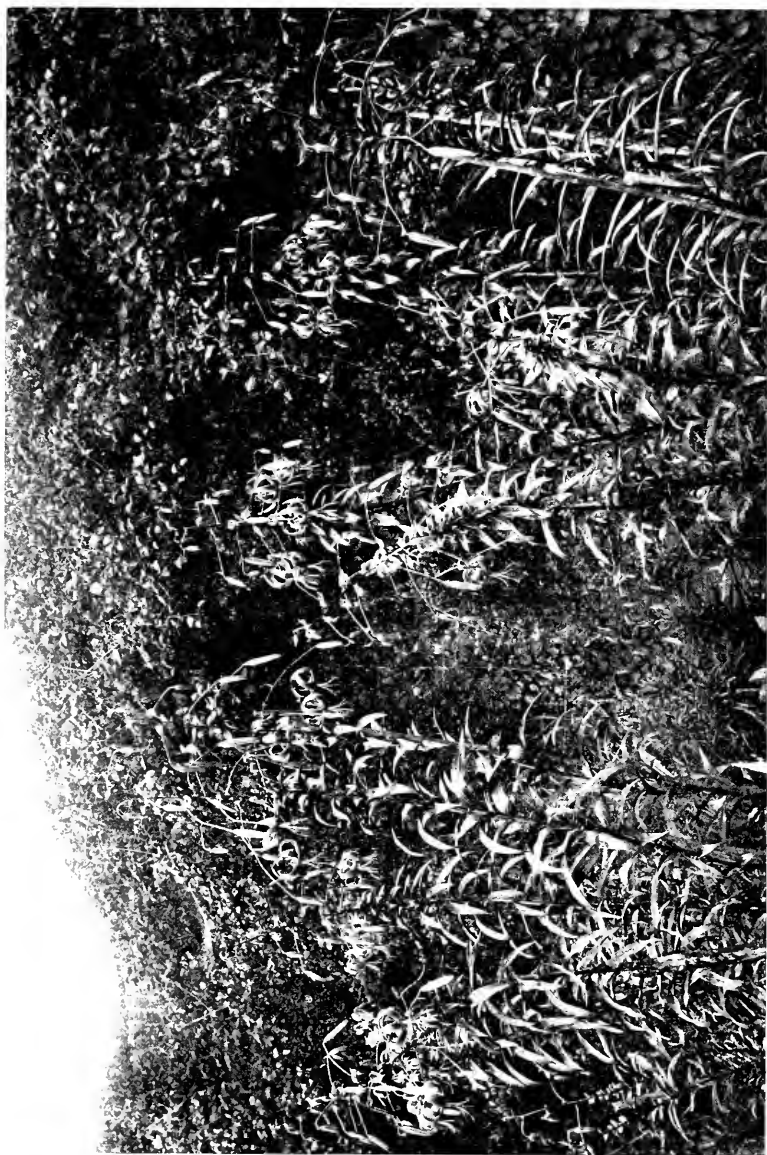
Szovitzianum, Caucasian Lily

From the Southern Caucasus there comes this Lily that has been known and grown in gardens for many years and yet withal it is quite rare to see it growing. One of its specific names is *L. colchicum* and some call it *L. monadelphum*.

Here is strong testimony to the value and beauty of the Caucasian Lily from a high authority on Lilies, Sir Herbert Maxwell who says "if he were limited to 3 species of Lily this would be one of the trio, on the sole basis of its loveliness and its lavishness in displaying its charms." It is a strong robust grower with its drooping yellow bells prettily poised on stout erect stems up to 6 feet in height. It has a few peculiarities: in the first instance newly planted bulbs will sometimes lie dormant in the ground for a whole year, and the following year grow up and flower in due season; also when established it is always late in coming up and is in danger of being destroyed in the spring clean-up by reason of its belated appearance.

Henryi

Towards the close of the last century Dr. Augustine Henry traveling in a remote part of Western China discovered a Lily to which his name has been most appropriately given. As a



LILIUM HENRYI IN A
NEW JERSEY GARDEN

summer-flowering species for the month of August it is the greatest Lily of its season, hardy, healthy and thoroughly dependable. Moreover, under garden conditions it seems to have improved by attaining a stature and profusion of bloom far exceeding that manifested in its native wilds, as Dr. Henry said he never saw it over 4 feet in height. It was first described as an orange-yellow *speciosum* because in shape and size its flowers resemble that species, but it is much more so by reason of its free and easy growth. Its stems attain a height of 7 to 8 feet and even higher with from 50 to 75 flowers but lack sufficient strength to keep them erect without some support. When planted among open shrubs in groups the sprawling stems fall into easy and graceful poses. It bleaches in the bright sun but if planted where some slight shade is obtainable during the brightest part of the day this slight defect could be counteracted.

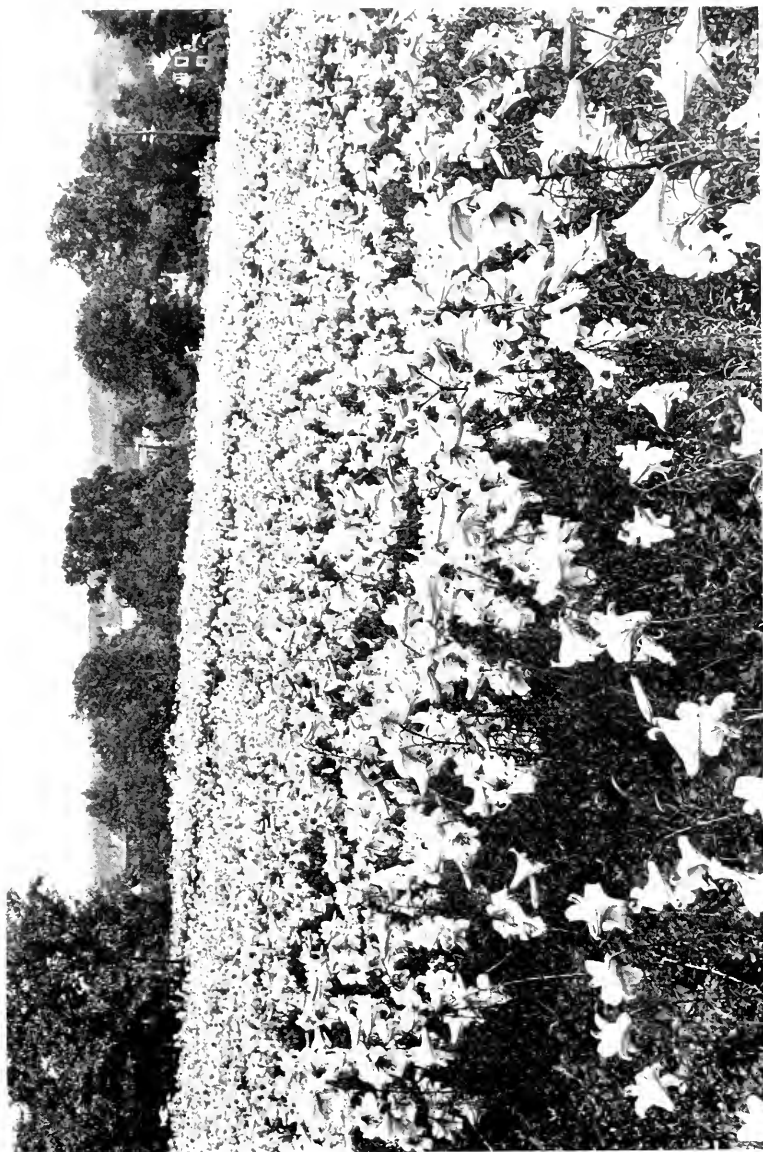
Regale

Again in recent years from distant China there has come to us another notable Lily that should awaken new interest in the family. Although the existence of this Lily in China was known, not until Mr. E. H. Wilson went there and brought it out in large quantities did it become available for our gardens. Already, however, it is making itself at home and is giving every promise of becoming a permanent garden Lily. It flowers in July bearing from three to seven flowers on stems four feet in height.

Martagon

One of the oldest and commonest of garden Lilies is the Martagon Lily easily recognized by its leaves in whorls around the stem and tapering spikes of reflexed or Turks Cap flowers, light purplish red and spotted. The Dalmatian form of the Martagon Lily however is an important garden kind and ranks with the very best. It will grow 6 feet or more in height and there is a distinctive richness in the wine-purple tint of its flowers.

The white Turks Cap, too, is a free and pretty Lily that seems easy to please as it grows and flowers well in sun or shade.



LILIJUM REGALE
ROSLINDALE, MASS.

(Courtesy of R. & J. Farquhar)

Hansonii

This is another good Lily of the Turks Cap type that comes from Japan and is as easy to grow as any plant in the garden. It attains a height of from 4 to 5 feet, flowers with exceeding profusion, and its color is a deep orange-yellow, heavily spotted with black. A shaded position helps to preserve its fine color which pales considerably in full sun exposure.

Tenuifolium

This is one of the most brilliant of Lilies, short lived in cultivation but easily raised and grown from seed. It is a native of Siberia, grows about 18 inches high, its slender stems have narrow grass-like leaves and bright scarlet flowers. It ripens seed freely and is easily perpetuated from seed as the bulbs which are about the size of a Tulip bulb flower the second year from sowing. A little seed sown each year would ensure having this little gem among Lilies flowering each year in due season. It grows freely and flowers abundantly in a light sandy soil. A new variety of this Lily having bright yellow flowers and called Golden Gleam has been recently obtained and those who have grown it say it is quite an acquisition and more robust than the type.

Giganteum

This is the noblest Lily known to man, yet few garden lovers know it and fewer still attempt to grow it. It comes from India from some of the high cool valleys of the Himalaya mountains where it grows at elevations of from 6000 to 10,000 feet and flowers during the rainy season from May to July. It is appropriately named *Lilium giganteum* and is all that the name would imply. To see it once in all its nobility is to remember it for ever after as one of the boldest and most beautiful of flowering plants. Its long cylindrical pendent flowers are white flushed and stained with purple in their interiors, and, borne aloft above the line of vision, so one looks up at and into them on stems that attain from eight to twelve feet in height.



LILIUM GIGANTEUM
THE NOBLEST LILY KNOWN TO MAN



LILIUM SPECIOSUM RUBRUM

In aspect and appearance this Lily differs greatly from all the other Lilies as it first develops great tufts of handsome spreading, deep green leaves which are of large size and quite attractive. The bulbs must attain a certain age or degree of vigor before a flower stalk is thrown up, but when that stage is reached the shoot starts up bearing leaves of the same distinctive character but diminishing in size and terminating just below the flowers. When a bulb has flowered it dies, but leaves behind several offsets which must themselves grow for several years before they attain to flowering strength and condition.

A sunny but sheltered spot in the woodland is the one to choose for this Lily and then give it a good deep soil well enriched with leaf mould and rotten manure. I have grown it and flowered it right out in the open border where it had little shelter and no shade and it grew 6 feet high and flowered. Is it not better however to try and find the condition that meets the need of the plant in an environment that will be conducive to its fullest development? This giant Lily is poorly adapted to the average flower bed or border but choose a nook in the shrubbery or woodland and make the soil conditions right and there is no reason why you should not grow it to perfection.

Speciosum

This is undoubtedly Japan's greatest Lily when considered from every point of view. It has been known and in cultivation 100 years and is forced or grown in pots in great quantities. In the color of its flowers it shows a wide variation. One may have selected varieties in every shade of rose through pale pink down to the purest white and the best white form has been named:

Speciosum Kraetzeri

A pure and most exquisite variety of this variable Lily. Why do we not grow these Lilies more in our gardens for they present no difficulties that must be overcome? When once established they are vigorous and profuse and specially valuable in continuing the Lily season through late summer and early



LILIUM SPECIOSUM ALBUM

fall. They will grow and flower in sun or shade and in passing through the country I recall having seen occasional plantings of this Lily thriving under the most haphazard conditions. It is worth a little effort to establish it. Failures sometimes arise because when one has to buy newly imported bulbs they usually arrive so late in the season that the bulbs are soft and flabby from their long journey and the ground is in poor condition to receive them, being cold and wet and conducive to rot. If planting is deferred till spring then the bulbs have still less vitality. A good way is when the bulbs are received to pot them up and carry them through the winter in frames and plant in spring or to grow them in pots for an entire season.

Auratum

The golden rayed Lily of Japan is generally conceded to be the most gorgeous of all Lilies. Although introduced to cultivation half a century ago it is a Lily of varied whims and caprices, a joy of joys when we succeed in inducing it to flower, but alas too often a despair when in spite of all our preparations, all our careful coaxing, it fails us utterly and we seem to know not why. There must have been many thousands of bulbs of this Lily alone imported from Japan since its first discovery. Those who collected it have told us it grew in countless thousands in a loose porous soil of volcanic origin and amongst vegetation which screened the lower part of the stem and roots but it reaches up and opens its blooms in the full sunlight.

I have seen it do well in some European gardens where planted among Rhododendrons it grew up from 6 feet to 10 feet in height and when in bloom words were inadequate to express its magnificence. One of the best forms of it is *macranthum*, which has no spots on the petals, only a yellow band through their centre. In the commonest type of *auratum* the petals are crimson-spotted and there is a striking variety named *rubro-vittatum* whose flowers have a crimson band down the centre of each petal. If you would try this Lily choose a sheltered spot, prepare the soil, which must be devoid of lime to



LILIUM AURATUM ON
CAPE COD

(Courtesy of R. & J. Farquhar)

the depth of 2 feet and plant the bulbs 10 inches deep. Try also potting up the bulbs and growing them in pots for the first season and remove any flower buds that appear, for rest assured if you can plant out established, rooted bulbs, your chances of success are much greater than planting shriveled bulbs.

Batemanniae

This is a choice little Japanese Lily with wide spreading rich apricot colored flowers that open well in full sunshine. It flowers in August and grows 2 to 3 feet high.

Wallacei

Also from Japan, this is a good companion to the preceding kind from which it differs in the flowers being thickly spotted and nodding, instead of erect, also it prefers rather more moisture at the root.

Japonicum

A Lily having pink flowers naturally excites interest and although this Lily was introduced from Japan many years ago it is rarely seen, because it is highly fastidious and apparently short lived under cultivation. Imported bulbs usually arrive in poor condition. Some growers have succeeded with this Lily by raising their own stock from seed which they obtained by careful treatment of an imported bulb, growing it in a pot till it flowered and seeded. This Lily was named after a Mr. Kramer who first sent it into Europe and it is now often called *Lilium Krameri*.

Rubellum

This is another pink Lily from Japan and of comparatively recent introduction, but it likewise is capricious and will never become a common plant although those who have grown it say it is more robust and easier to establish. It seeds freely and the Lily enthusiast who will take the trouble to raise a

healthy stock will eventually be well repaid for the extra trouble.

Tigrinum

The Tiger Lily comes from China and Japan, has been long in cultivation and is generally well known. There are two good forms of it that deserve special attention, namely *tigrinum Fortunei* which grows 6 feet high and blooms a little later than the type; also *tigrinum splendens* for its larger and more highly colored flowers. There is also a double-flowered form, but what gain is it to double the Lily and destroy its beautiful form? The Tiger Lily is one that anybody and everybody who wishes can plant in confidence that it will live long, grow freely and easily and flower abundantly.

AMERICAN LILIES

We have native Lilies which are by no means to be despised and among these the most familiar species are:

Canadense

A graceful, pretty and variable species and well worthy of garden culture. It comes in shades of yellow and red with its nodding flowers prettily poised on stems two to four feet in height. I have seen the reaping machine go into the hayfield late in June and lay low ten thousand such Lilies. A repetition of this practice soon results in extermination. There is a suggestion here that may be helpful. This Lily grows in the fields in the open sunlight and can hold its own in competition with all the other vegetation on the ground which serves to shade and keep the Lily roots cool. Plant it under like conditions of association, but where it will not have to be cut down in the fullness of its beauty and you will have added a permanently established charm to the garden.

Superbum

In the late summer days this is another Lily common in the east and surely not sufficiently appreciated. It is fittingly

named *superbum* for it is a superb Lily and a long-lived one too, as I can go to certain spots where I first saw this Lily growing wild twenty years ago and it reappears in all its brilliancy as regularly as its season rolls round. It requires rather more moisture than most of our Lilies, as one finds the best examples in or near situations where swamp conditions prevail, so that the roots can find abundant moisture. In garden culture, given a good deep soil and water if drought conditions occur, it will be found a good garden Lily. It varies somewhat in color from light red to dark crimson, and vigorous examples grow as high as 8 feet bearing many flowers.

Parryi

This comes from the real home of American Lilies which is on the Pacific slope especially in California and this species abounds through southern California and Arizona in the mountains at elevations of from 6000 to 10,000 feet. It is a gem, rich yellow in color with spottings of chocolate brown. It grows 3 to 4 feet or even more in height and when thriving bears as many as 18 flowers and buds. Carl Purdy who has told us so much about Californian Lilies says, "It is best at lower elevations and where streams have thrown up a deposit of sand, silt and leaves, attaining to even 6 feet in height."

Pardalinum

The Panther Lily so called from its abundant spotting is one of California's commonest Lilies. It loves plenty of moisture as its habitat is along banks of streams and in most hollows. It grows 6 to 8 feet high, its flowers are much recurved, profusely spotted and very variable in color in shades of yellow and red. The most distinct form of it is that named *Roezlii* which comes from Oregon. There are some selected natural forms too which have had popular names given them as Glow, Defiance and Red Giant. It has a strong healthy constitution and is in every respect a good Lily for gardens.

Hybrid Lilies

Although certain species of Lilies have given us form and color variations there has not been much inter-breeding of the species and even the efforts of plant breeders have accomplished very little. There used to be a Lily named *Parkmanni* an American hybrid obtained from *auratum* and *speciosum* which was of striking beauty but it has never been abundant and now seems lost entirely.

Testaceum, Nankeen Lily

This is supposed to be a natural hybrid between *L. candidum* and *L. chalcedonicum* but efforts to demonstrate this fact have not met with success. It is a charming companion to the Madonna Lily, not difficult to grow and worthy of the effort to establish it in the garden as one of the loveliest of the Lily family. It flowers in July, the flowers borne aloft on stems 5 feet in height. They are of a distinct fawn or nankeen yellow color, with conspicuous bright orange anthers.

The variety called Golden Gleam is a yellow-colored *tenuifolium* resulting from crossing this red-flowered species with the white *L. Martagon album*. *L. Dalhansonii* is a good hybrid between *Hansonii* and *Dalmaticum*. There do not appear to be any others of prominence.

The following table shows the best sorts for the average grower, their culture, season of bloom, color of flower and usual height. There are four clearly defined types of Lily as indicated in the table by the letters, A, B, C, and D. First the funnel form like the Easter lily (A). Then the pendent spreading or bell form (B). The same flower erect is the cup-like type (C) which flowers the earliest of all; and (D) the turk's-cap group with petals completely reversed.



LILIUM EXCELSUM
GRAVETYNE MANOR,
SUSSEX

CULTURAL KEY	NAME, TRADE OR CATALOGUE	SEASON OF BLOOM	TYPE OF FLOWER	COLOR OF FLOWER	HEIGHT AVERAGE
*	<i>Elegans alutaceum</i>	May	C	Apricot	9 in.
*	<i>Bulbiferum</i>	June	C	Crimson	1 ft.
*	<i>Elegans Alice Wilson</i>	June	C	Lemon yellow	1½ ft.
*	<i>Elegans Aurora</i>	June	C	Orange, suffused with red	ft.
*	<i>Elegans Incomparable</i>	June	C	Rich crimson red spotted with black	1½ ft.
*	<i>Elegans Van Houttei</i>	June	C	Crimson	1 ft.
*	<i>Tenuifolium</i>	June	D	Bright scarlet	1½ ft.
†	<i>Browni</i>	June, July	A	Pure white inside, reddish brown outside	2-3 ft.
*	<i>Candidum</i>	June, July	A	Purest white	4 ft.
*	<i>Croceum</i>	June, July	C	Deep orange	3-4 ft.
*	<i>Maculatum (Hansonii)</i>	June, July	D	Rich yellow, spotted with black	3-4 ft.
*	<i>Martagon</i>	June, July	D	Purple	3 ft.
*	<i>Elegans (Umbellatum Dahuricum)</i>		C	Vars. pale yellow through orange shades to deepest crimson	2 ft.
†	<i>Canadense</i>	July	D	Variable in shades of yellow and red	3 ft.
*	<i>Chalcedonicum</i>	July	D	Bright scarlet	3-4 ft.
*	<i>Elegans venustum macranthum</i>	July	C	Orange	2 ft.
*	<i>Testaceum (excelsum)</i>	July	D	Nankeen yellow, unique in color effect	4-5 ft.
	<i>Grayi</i>	July	D	Red with purple spots	4 ft.
†	<i>Humboldti</i>	July	D	Yellow spotted with	4-6 ft.
*	<i>Longillorum Wilsoni</i>	July	A	Purple white	3-4 ft.
*	<i>Martagon album</i>	July	D	Pure white	3 ft.
*	<i>Martagon dalmaticum</i>	July	D	Dark shining blackish purple	4-6 ft.
†	<i>Szovitzianum</i>	July	D	Pale to deep yellow spotted black	4-5 ft.
†	<i>Pardalinum</i>	July, Aug.	D	Varies from orange to bright red & spotted	6-8 ft.
†	<i>Superbum</i>	July, Aug.	D	Orange red to crimson and black spotted	6-8 ft.
†	<i>Auratum</i>	August	C	White, crimson spotted with yellow band down centre of each petal	4 ft.
†	<i>Auratum platyphyllum</i>	August	C	White, red spotted and yellow banded	4 ft.

CULTURAL KEY	NAME, TRADE OR CATALOGUE	SEASON OF BLOOM	TYPE OF FLOWER	COLOR OF FLOWER	HEIGHT AVERAGE
†	Auratum virginale	August	C	White, yellow spotted and yellow banded	4 ft.
†	Auratum rubrovittatum	August	C	White, with crimson band down each petal	4 ft.
†	Auratum Wittei	August	C	White, unspotted, yellow banded	4 ft.
*	Batemaniiæ	August	C	Rich apricot	3 ft.
	(Elegans fulgens)	August	B	Red, black spots	3-4 ft.
*	Tigrinum	August	B	Red, heavily spotted	5 ft.
*	Tigrinum splendens	August	C	Apricot, yellow, with dark spots	3-4 ft.
†	Elegans var. Wallacei				
*	Henryi	Aug., Sept.	B	Deep orange yellow with darker protuberances	4-8 ft.
*	Speciosum album	Aug., Sept.	B	Pure white	3 ft.
*	Speciosum rubrum	Aug., Sept.	B	Rose colored	3 ft.
*	Speciosum Melpomene	Aug., Sept.	B	Dark crimson purple	3 ft.
*	Tigrinum Fortunei	Aug., Sept.	B	Red, heavily spotted	4 ft.

* All the lilies marked thus should thrive in any ordinary fertile good garden soil. If the available soil is naturally close or adhesive it can be lightened and made more porous by digging some coarse sand into it. If the soil is light and sandy procure some clay loam and incorporate with it, but in a broad sense all these lilies can be depended upon to live and increase under average garden conditions.

† These lilies require a good soil, and if the soil is heavy it should be lightened by the addition of some leaf mold or peat; also these lilies do not quite so well withstand heat and drought. Partial shade is beneficial especially at their roots, which can be provided by interplanting them among other plants that will shade, yet not too densely cover the ground.

‡ This group embraces all native species and they are shade and moisture loving. Although they lift up their tall flower spikes to the bright sun, they like a cool root run at all times. In a cool north corner, or by lake or stream, or in any moist hollow, about or near the garden, these lilies are a host in themselves wherewith to make a summer picture.

Madison, New Jersey.

Growing Vegetables for the French Army

The Garden of London recently printed the suggestion below as possible aid to the British Government in supplying its Army with fresh vegetables. The inference for our Government is obvious. One of the illustrations shows natives of Tongking working the Trianon Gardens at Versailles for the French Army.



THE editor of *Country Life*, [England] having made a recent visit to France, describes in the pages of his journal the efforts that are being made by France to supply her soldiers with vegetables. From his impressions it is evident that the work has been carried out in haste and with due regard to labor and expense; but for all this the scheme has proved a brilliant success. The question is naturally asked: What are we doing to provide fresh vegetables for the British soldier? A strong plea is made for the appointment of a Director of Food Production for our troops in France. It is hoped that the time is not far off when a qualified horticulturist, who is also a good organizer, will formulate a plan and carry out the cultivation of vegetables in France. We wish all speed and success to the suggestion made in *Country Life* that a Head Director of Food Production should be appointed in France for the whole army, and under him sub-directors for each individual army. "The scheme already accomplished for the French Army owes its inception and birth to the studious and practical mind of Lieutenant Georges Truffaut, whose name is familiar to English gardeners. Before the war he owned and edited *Jardinage*, one of the finest gardening periodicals ever issued.

"At the moment it will be enough to give a broad outline

of the scheme. The work was only set going in April, and involved some reclamation at the outset. Vegetables were grown in the Trianon Gardens before the war, but for three years the ground had been neglected and allowed to lapse. How to get rid of the weeds and bring the ground speedily into a cultivated condition was the first problem. Expert gardeners will need no telling that land with such a history was bound to be infested not only with weeds, but insects. In France, as in



NATIVES OF TONGKING WORKING IN THE TRIANON GARDENS,
VERSAILLES, FOR FRENCH FIGHTING MEN

England, the latter were very prevalent during the year, so much so that it was difficult to raise cabbage seedlings to be replanted, so as to stand out all the winter, on account of the ravages of the turnip fly. Lieutenant Truffaut found an easy and effective way out of the difficulty. Interested as he is in English experimental work, he was thoroughly familiar with what Dr. Russell has done at Rothamsted in his sterilization experiments. The knowledge thus acquired was applied with

happy effects to the growing of seedling plants. Let the reader realize that 25,000,000 plants have been raised here between April and September, and his imagination will easily clothe the ground and fill the beds between their alleys with their green inhabitants. It was impossible to conceive anything fresher or healthier. Lieutenant Truffaut attributes his success largely to an application of Dr. Russell's experiments at Rothamsted, which also had the unexpected effect of enabling him to do without manure. His method of cultivation after the usual preparation of the ground was to give a dressing of bisulphide of carbon. This not only checked the insect pests most successfully, but acted as a most effective stimulant to growth. Readers will like to know that the material was obtained in liquid form and applied through the water-can an hour before sowing. Its effects were manifested by contrast with a control plot which had not been treated with the bisulphide. On this the ravages of the insects were shown in leaf and plant—often in the absence of the plant, which had been entirely devoured. The sowing was done by machine and in drill, which—this again being proved by a control plot—gave far better results than sowing broadcast. He attributes this in great measure to the regular depth of about half an inch at which the drill sowing was done by machinery, and the necessarily irregular covering of the seeds sown broadcast. Watering was carried out systematically and consistently, partly by watering-cans and hand labor, partly by the use of an admirable mechanical contrivance.

What have to be considered just now are the economies effected and the extent to which they are practicable in case it were thought desirable to adopt a similar scheme behind the English lines. Let it be remembered that the production amounted to 25,000,000 plants, and that the plants were chosen as being particularly suitable to the needs of the French Army. They consisted of varieties of Cabbage to the number of 6,567,000; Onions were grown in huge quantities, and were still being sent out at the beginning of October. Very strong and forward plants they were. Of the famous Paris Onion no

fewer than 7,200,000 were sent out. It is very highly favored by the French, who prefer a white, medium-sized Onion to the Giant Rocca and Ailsa Craig favored in this country. It comes to the table about May. Another popular white Onion is the Oignon de Vaugirarde, of which 1,900,000 were sent. The red Spring Onion de Nort was sent out to the extent of 1,800,000. Onion and Cabbage plants were monopolizing attention in September and October. Earlier in the year other vegetables had been grown, such as Leeks; 5,424,000 Endive, Curled and Ba-



(Courtesy of The Garden, London)

ACRES OF CABBAGES AND ONIONS FOR THE
FRENCH ARMY

tavian; 1,836,700 Cauliflowers, Broccoli, Kohl-rabi, Celery, Tomatoes, New Zealand Spinach, and so on. Lieutenant Truffaut recommends the last especially for its vigor and productivity. It was growing well at the time of the visit referred to, and lasts till the first keen frosts.

The question of labor was approached in the true spirit of economy. We in England appear to believe that money can do anything; our French allies hold that its wholesale expenditure can be avoided by a use of mother wit. Soldiers were em-

ployed at the rate of pay they receive on the field, and they accepted this small remuneration because they liked the work and knew that the plants were supplied to their brother soldiers free of charge. This is a spirit which ought to be emulated. In the British Army are thousands of garden enthusiasts who would take delight in growing vegetables if the plants were found and they were convinced that their doing so would be for the common good."

*Medicinal Herbs: Their Cultivation and Preparation in Great Britain**

By E. M. Holmes, F.L.S.



SINCE the commencement of the war, considerable interest has been aroused concerning the necessity for cultivating some of the more important medicinal plants on a larger scale than heretofore, for two of the facts that stand out clearly as a result of the war are that there is a shortage of supply, and that we have been hitherto largely dependent on Austria and Germany for medicinal plants and herbs, many of which have been imported at a lower price than they can be grown or collected in Great Britain—so much so, indeed, as to have seriously affected the home industry.

It will perhaps be useful to direct attention to some facts concerning the present position of the cultivation of medicinal plants in this country. It must be distinctly understood that it is only a minor industry, as compared with that of food

* The shortage of drug plants, due to the war, has greatly increased interest in their cultivation, both here and in England. In the latter country activity has been very marked and early in 1917 the following note appeared in press dispatches:

"After consultation with leading firms of drug dealers and medical men, the Women's Herb-Growing Association, recently formed in England, has drawn up a list of the medicinal plants which it is both desirable and profitable for women to grow in their gardens and allotment plots. In the old days England used to grow most of its own drugs, but in recent years the industry has passed largely to Germany, Austria-Hungary, and the Balkans. The new association intends to prove that the industry can be carried on just as well in England by women. Among the plants in urgent demand are monkshood, chamomile, deadly nightshade, thorn-apple, henbane, purple fox-glove, fennel, opium poppy and valerian."

For those interested in this practical gardening, Mr. Holmes's article (from the *Journal of the Royal Horticultural Society*) and the one by Mr. Miller which follows directly after (from the *Bulletin of the Torrey Botanical Club*) will be found useful.—Ed.

products, but it is, nevertheless, one of national importance, seeing that it concerns the health of the nation, and the enormous requirements of our sick and wounded sailors and soldiers, as well as of our ordinary hospitals and dispensaries. Why there should be any necessity to import from Austria and Germany plants that grow well in this country is not at first sight obvious. The real reason for their importation is clearly a financial one, viz., the well-known law of commerce to buy in the cheapest market and sell in the dearest. This tendency, together with the neglect of scientific organization and the absence of a protective tariff, has led to the purchase by this country of cheaper material from abroad. As in many other cases, the public has remained in ignorance of the way in which free trade has injured the home industry.

The demand for cheap physic, fostered by the co-operative stores, has reduced the price of drugs to a point at which no pharmacist can make a living unless he sells other articles, properly belonging to other trades; and this unfair competition has naturally led to the importation of cheap medicinal plants and herbs to meet the demand. These imported medicinal plants are naturally, in nine cases out of ten, of inferior quality, and sometimes mixed with dangerous herbs. I may mention a case in point. Some years ago I was asked to examine and report upon a sample of Belladonna root which had been supplied under contract to one of the large London hospitals, and I found that it contained quite a large proportion of Poke root (*Phytolacca decandra*), which possesses violently emetic and purgative properties. Tracing the root to its source, I learned that it came from Trieste, but as the root is an American drug, why it should have come from Austria remained a puzzle until, some years subsequently, when the Hungarian Exhibition took place in London, a Hungarian Professor of Materia Medica informed me that the plant had been grown in Bosnia for many years past for the sale of the berries, which were employed to colour wines, but that a more satisfactory berry, imported from Chile, known as Macqui (*Aristotelia Macqui*, Fam. Tiliaceae), has superseded it, and as the leaves of the Bosnian plant re-

sembled those of Belladonna in shape and size, and the root resembled that of Belladonna in colour, the roots were got rid of by mixing them with Belladonna root, and the dried leaves with those of Belladonna leaves. Instances could be multiplied showing the danger of allowing cheap European drugs to compete with those obtainable in this country. In the United States there is a Government Inspector of Drugs, but the medical profession in this country has no such protection against the importation of inferior and adulterated medicinal plants.

No country, as a rule, exports its best products, but keeps them for home consumption, unless the price offered is a sufficient inducement to do otherwise. Even India does not send to England the best quality of Indian hemp, but the product of the previous year, which is less active than that of the current year. Germany and Austria follow the usual rule, and send abroad their surplus produce at the cheapest possible rate.

The purity and good quality of medicinal plants are of the greatest importance from a medical point of view, and any inequality in the strength of important and highly active medicines is sure, in the long run, to discourage the use by medical practitioners of those particular medicines. It is to avoid variation in the strength of preparations made from medicinal plants that the Pharmacopoeia is issued by the General Medical Council; but unfortunately the compilers of the Pharmacopoeia do not, as a rule, inform themselves of the commercial difficulties connected with the medicinal plants industry. Thus a few years ago some careful scientific experimentalists found that different commercial samples of the active principles of Aconite varied so considerably in strength that one sample was seventy times stronger than another, or in other words that the dose of a medicine made from one would be equal to seventy doses made from the other. This was due to the use of roots of wild Aconite imported from Germany. As there are about twenty wild varieties of *Aconitum Napellus*, and all are not known to be equally active, and the roots are gathered indiscriminately so long as the plants have a blue flower, it is obvious that roots obtained from a definite culti-

vated variety are better than those of wild plants. But the use of the cheaper German root, which is almost always of a mixed character, has led, in the case of this very powerful and most valuable medicine, to its cultivation in this country having practically ceased, and to the medicinal preparations of the plant falling almost into disuse, through unreliability of therapeutical action, due to their variation in strength, from being derived from different species of Aconite in Germany. As the genuine Aconite root no longer pays to cultivate in this country being undersold by German and Japanese roots, it has become unobtainable, and the Pharmacopœia has consequently been compelled not to restrict, in the present edition, the medicinal root to plants cultivated in Britain, as it did in the previous edition of 1898. A protective tariff would have prevented this undignified and undesirable position.

I am informed that a good many owners of large country houses, who have large gardens and skilled gardeners, are anxious to take up medicinal plant cultivation from a patriotic point of view, but in most cases have no particular knowledge of herb-growing except for the herb-gardens which are grown for amusement in so many large establishments, and are desirous to learn some thing about the industry, and by what means Great Britain can be made independent of the importation of medicinal plants and herbs from Germany and Austria. And as it is quite possible for owners of country houses and large landowners to help in this matter, I will first indicate how this might be done, using two important medicinal plants for the purpose of illustration, viz. Belladonna and Foxglove.

Belladonna is a most valuable plant in the treatment of eye diseases, and also taken internally for some forms of pulmonary disease, and as a local application to ease pain; it is also used as a source of the alkaloid Atropine. It is one of the medicinal plants of which the exportation is forbidden. It is a somewhat local plant, being almost confined to calcareous soils, but nevertheless occurs in twenty-eight British counties, finding its southern limit from Dorset to Kent, and its northern one in the counties of Fife and Argyll, although comparatively rare north

of Yorkshire and Westmorland. It is a perennial plant, growing most luxuriantly under the shade of trees on wooded hills, on chalk, limestone, and oolite, but becoming dwarfed when growing in old quarries, or spots exposed to the sun, and consequently, although cultivated in the open, it there rarely attains a large size, and is more subject to insect attacks under cultivation than when grown under natural conditions. An enormous increase in the yield could be obtained if the head gardeners on estates where it grows wild were instructed to distribute, in April, all seedling plants to other positions in the same woods, since the seedlings are often too crowded where they do occur. If the gamekeepers were instructed to see that the plants were not stolen, and the plants were cut at the proper time, and sold to the agents of the wholesale drug trade, there would, in my opinion, be no need to import *Belladonna* at all, whether herb or root, and it is quite possible that there would be a sufficient supply even for export to those of our Colonies where the climate and local conditions prevent its successful cultivation. Its limits are latitude 50° — 55° N., an altitude of 300–600 feet (although it may descend to sea-level where the soil is calcareous, as in Lancashire, especially where the drainage is good and the necessary amount of shade is found). The range of temperature is 50° – 47° F. Young seedling plants, unless protected by dead leaves during the winter, often perish. It is therefore a plant that cannot be successfully grown in every small garden.

With respect to *Digitalis* (Foxglove), there is an enormous quantity growing wild, in damp hilly woods in this country. I have seen on the banks of the Dart, in Devonshire, a whole hillside purple with the flowers, where the coppice wood had been cut. But unfortunately large landowners object, as a rule (or perhaps it is only the gamekeepers) to people collecting the leaves until after June 15, or indeed at any period of the year, for fear of disturbing the game. It is a biennial plant, and seems to exhaust the soil, for it will often disappear entirely from places where in previous years it had been abundant, although this may be due partly to the attacks of a small pug

moth (*Eupithecia pulchellata*), the larvæ of which feed on the flowers. It seems to require a fair amount of moisture and plenty of humus, but also good drainage, and is rarely found on calcareous soils, preferring siliceous and slaty or sandy ground. But I will venture to say that if large landowners, whose soil is siliceous, will give instructions to their head gardeners to plant out the young plants, or scatter the seed in autumn, in fresh localities to which access is possible without disturbing the game, there would be no necessity to import *Digitalis* from the Continent. It is, perhaps, the most important remedy for strengthening the action of the heart, but is very liable to lose its strength if not properly dried and preserved. I have, however, been able to dry the leaves so that they retained their colour and their activity for eleven years. Foxglove leaves, properly prepared, might become a national export. Indeed, one firm does export to the United States large quantities, which are physiologically tested after drying and before being exported.

There is another way in which landowners and large farmers who are patriotic enough to wish to help the industry might render a considerable service. A very large quantity of herbs are used in this country in the manufacturing districts in the Midland counties, where a decoction of herbs, sometimes fermented with sugar, is drunk under the name of Herb Beer or Botanic Beer, especially by those working in the great heat of iron manufactories and potteries, and it is necessary that the herbs used should be cheap. Hence they are largely imported from the Continent. This is so much the case that last year English Melilot and Woodruff were not procurable, and this year even the largest wholesale herbalists could not supply even a few pounds of Agrimony, which is quite a common English herb, and is one of the herbs used in making beer. This scarcity is due to the fact that the thorough organization of the herb industry that prevails in Germany does not exist in this country. The way in which landowners could help, together with the local authorities, would be by inducing the farmers to let their labourers' children learn, from the local teacher of botany, to recognize all the herbs that grow in their neighbourhood, and

to induce the local authorities to arrange for the economic use of the waste heat of refuse furnaces, lime-kilns, and brick-kilns to heat drying-rooms that might be built near by. Means for doing this could be easily devised, without danger from the carbonic acid or carbonic oxide formed by the fires, on the principle adopted in the old Roman villas.

So far as I can learn, German children are taught to recognize and collect all medicinal herbs that grow near their homes, and these are dried in small quantities in sheds or attics, and probably finished off in farmhouse bread ovens after the removal of the bread. A collector or middleman calls round and buys up the small parcels, and forms them into bales to be forwarded to the wholesale herbalist; and with three profits to be taken, *i.e.* by the gatherers, middlemen, and wholesale herbalists, the herbs can still be sent to this country cheaper than a working man can collect them here. Yet I saw last year on one waste hilly field near Sevenoaks enough Centaury, Purging Flax, St. John's Wort, and other herbs to yield several hundredweight, and in another field close by enough Wild Carrot to supply a wholesale herbalist for a twelvemonth. There was even an oasthouse for drying hops close by, which is only used in September, and could be available during other months. It seems absurd to import Coltsfoot by the ton, when every clayey railway bank, or heavy waste ground, is covered with the plant. The means of drying these, if provided by local authorities or wealthy landowners at small cost, would help the industry to overcome competition. If children of farm labourers were taught to collect them, it would encourage industrious habits in them, give them a healthy occupation on holidays, keep them out of mischief, and add a little to the scanty wages of their parents.

Another way in which the medicinal herb industry could be very considerably improved could be adopted in the herb gardens of large country houses. Many ladies take a great interest in the history and uses of medicinal plants, but have probably paid no attention to improving the strains by cultivation. This is a subject well worthy of attention, and could easily be studied by the aid of an intelligent gardener. Thus,

Aconitum Napellus exists in twenty-four or more wild varieties, yet it is not known how far these vary in the strength of the active principle, nor which are the strongest growers. Careful observation would also show the best and quickest methods of reproduction. Thus, young Aconite plants can be produced at the lower joints of the stem by earthing them up, and in other conditions young plants can be developed on the roots. The seeds of Aconite, like many other Ranunculaceous seeds, will not, as a rule, germinate unless planted as soon as ripe.

Belladonna herb and root are sold by analysis, the value depending upon the percentage of alkaloid present; and although some experiments have been made in the United States we have as yet no conclusive evidence as to the conditions of soil and temperature, &c., under which the highest percentage of active principle can be developed.

Similarly, the conditions under which the annual form of the biennial Henbane is developed, and the possibilities of obtaining the more valuable biennial form from the annual one, yet remain to be shown. There is no doubt, however, that the character of the seed has a good deal to do with it. The first formed seeds are naturally the strongest, and as the fruits do not all mature at the same time, but the seed is usually collected at one time, there is sure to be a large proportion of seed too weak to produce strong plants, or too immature to germinate when sown.

It is obvious, therefore, that there is plenty of room for much interesting work to be done in connexion with improvements in the cultivation of medicinal plants. I might add one more illustration. The double-flowered Chamomile, which is the variety chiefly used in medicine, is apt to revert to the single-flowered form, and the conditions under which this occurs, and the remedy for it are also worthy of investigation.

There is another and less fortunate class of the community who, although intensely patriotic, are anxious to help themselves, or those dependent upon them, at the same time that they help their country. I allude to educated women with small incomes, many of whom have joined the Women's Herb-growing

Association, formed since the war commenced. Unfortunately they have, I fear, been misled by extravagant statements in newspapers, both in this country and in the United States as to the large possible profits arising from the cultivation of medicinal plants and the collection of wild herbs. I endeavoured a year ago to make known the only conditions under which herb-growing can be made to pay by publishing an article on the subject in the "Pharmaceutical Journal" (for January 2, 1915), but as that number is out of print I have had it reprinted, together with two others, giving lists of the herbs which at the present time are wanted by the cwt. and ton. I pointed out that it would not be possible for the wholesale trade to deal with small quantities, as they would not get uniformity of quality, and it would necessitate additions to their staff to deal with them, and that cultivation and collection of medicinal plants and herbs can only be profitably carried out on co-operative lines.

It may be useful, perhaps, to take this opportunity of briefly recalling some of the statements there made, which can be read at leisure in the reprint alluded to, and to add a few facts concerning the present conditions of the industry.

First, with regard to two of the principal medicinal plants, viz.: Henbane and Belladonna. It may be taken for granted that the plants yielding the largest profit under cultivation are just those which are the most difficult to cultivate, and it is those very difficulties which enhance their value. To take Henbane for an example. The wild plant occurs in two forms, and has been found wild in sixty British counties, or rather twice the number of counties that Belladonna occurs in, and yet it always exceeds the latter in price, because it nowhere occurs profusely, and is found under circumstances that appear at first sight to be quite contradictory, growing in some places on sandy spots near the sea, in others on chalky slopes, and in cultivation flourishes in a good loam. When sown, the seed sometimes comes up quickly and flowers the first year, when only a few inches high, especially in a dry spring and summer. In other cases it produces only large leaves, in the autumn,

often more than a foot long, and the second year sends up a large branch flowering stem, but sometimes the whole of the foliage is destroyed by the larvae of a leaf-mining fly, *Pegomyia hyoscyymi*, and the crop rendered worthless in a week. But sometimes the seed will not germinate the first year, or even the second, and when the field has been ploughed, and some other crop sown, up it comes. A curious case occurred some years ago at Weymouth, showing that the seed in certain circumstances may retain its vitality for a very long period. A house on the Parade which had been built 100 years, was pulled down, and next year there appeared on the cleared building-ground numbers of Henbane plants, although this plant does not occur in the neighbourhood within many miles of the spot. Even if Henbane seed comes up strongly the first year, when the large autumnal leaves decay away the large terminal bud is often destroyed by one of the many macro-lepidopterous caterpillars that, like the Agrotids, hide themselves in the soil; or floods may rot the plants in winter if grown on level ground.

It would probably pay well to cultivate Henbane in sandy ground near the sea, especially on rich estuarine soil, or in sandy ground in such places as the Golf Links at Westward Ho or Dawlish Warren, where the seaweed could be used as manure and there is sufficient moisture at a depth of two feet for the roots to reach it. It obviously is therefore not a plant for profitable cultivation in small gardens, especially as the yield of dried leaf is extremely small.

Cultivation

The actual cultivation of medicinal plants can only be carried out properly on a fairly large scale under present conditions. To the ordinary grower the first year's outlay brings in practically no return, so that sufficient capital is required to meet the outgoing expenses in labour, manure, and rental for that year, and for the second also if the crop fails from any cause. There is also the initial expense to be considered of apparatus for drying herbs, and the difficulty of getting labour, when wanted, unless it is employed all the year round.

So far as I have been able to judge, the cultivation of the most important medicinal plants in this country only pays well when there is sufficient capital to run a pharmaceutical manufactory close to it so as to utilize the fresh plants in years when the crops are more than equal to the demands, by making them into extract or other preparations that will keep.

If medicinal plants are grown on an ordinary farm where labour and animal manure are always available, the difficulties in the case of Belladonna and Henbane are, that unless the farmer has suitable drying apparatus he must sell the fresh plant, and if he is far from a large town the expense of cartage and rail considerably reduce his profits, and he is at the mercy of the buyer, who knows that the green herb must be sold within about a fortnight, or the plants will have passed their best condition. But if he has a good drying-house the farmer is able to keep the dried plants over the winter, and is thus able to secure some profit.

As the wild plants are collected from estates by men who sell them without knowing their market value, and are therefore at the mercy of the buyer, they are sometimes bought up by growers who can dry them. The farmer who has no drying-house finds it better to grow potatoes than medicinal plants. It will therefore be readily understood that the growers who have manufactories, and the growers who have drying-houses but no manufactories, are few in number, and when an unusual demand arises the prices both of the wild and the cultivated plants increase, and it is then that the Continental supplies are employed to lower the price of the home production.

Collection of Medicinal Plants and Herbs.

As a general rule, the direction given in the Pharmacopœia for the collection of leaves is at the period when the flowers are beginning to open, because it is supposed that the active principles of the plant are then most abundant in the leaves, before migrating to the flowers, the active principle serving apparently as a protection against insects, and thus moving on from root

to stem, leaf, flower, and seed, as each organ is successively developed.

Roots are most active when the new root is fully formed, before the plant is developed, as in Aconite; or in the case of some perennials like Dandelion, in the spring, before the flowers are developed. To some extent the collection of roots is ruled by other circumstances, such as the convenience of the farmer, as they are more easily and conveniently collected when the land is ploughed, or when the crops which permit it, such as turnips, are weeded. It is then comparatively easy for the weeders to put on one side in definite heaps such wild herbs as Fumitory, Parsley Piert, and Cudweed, which are common in cultivated fields. In collecting tall herbs, it is necessary to cut their stems off above where the lower leaves have turned yellow or brown, so that when dried they may present a bright, not faded, green color. The collection should take place so far as possible on dry or sunny days. Easterly winds are particularly favourable for this purpose, as the dry air causes rapid withering, and facilitates the process of drying. Herbs should never be collected in wet weather.

Drying

There are many methods of drying. Ordinary herbs with fairly rigid stems, like Peppermint and Wormwood and Yarrow, are best tied up loosely in bundles, and hung on strings or wire, until the leaves are withered, but should be kept under cover in case of a shower. Artificial heat may then be used to dry the stems, and thus finish the operation. The bundles should be made as far as possible nearly equal in length, and uniform in size, for convenience of packing. In the case of flaccid herbs these should be thinly spread on a flat, dry surface, in a place freely exposed to a current of air and sunshine. This may be done in the open air in summer weather, provided an arrangement is made by the use of Willesden scrim or tarpaulin, supported on a roller, so that it can quickly be drawn over the herbs to protect them in case of a sudden shower. This is especially necessary in the case of Chamomile flowers, which

soon turn brown if wetted. Smooth leaves like those of *Belladonna*, or sticky leaves like those of *Henbane*, require to be dried in a single layer at first, as they shrivel and become discoloured if treated in masses. The secret of all good drying is to deprive the leaves or other plant organs of moisture as rapidly as possible, and to see that the lamina or thin part of the leaf is fairly dry before using artificial heat to dry the stems. It must be understood that the majority of plants lose at least 72 per cent. of moisture in drying, and some leaves, such as *Belladonna*, lose 85 to 90 per cent., so that it usually requires 4 lb. of fresh herb to yield 1 lb. of dried, and in other cases 6 or 8 lb. to yield one. It must also be borne in mind that, after herbs, &c., are thoroughly dried, on exposure to the air they will absorb from the atmosphere about 12 per cent. of moisture and become flexible, but leaves that are allowed to do this, although less brittle and therefore more convenient for handling, are apt to deteriorate in physiological action. In some cases, such as *Digitalis* and *Ergot*, this consideration is of the utmost importance. I have found, however, by experience, that, if kept chemically dry by means of lime, they retain their activity unimpaired for at least ten years, and probably much longer. This process has not as yet been generally adopted, but firms who use it have acquired an excellent reputation for the quality of their goods, especially of *Foxglove*. It is in this direction, *i.e.* carefully dried and preserved herbs, that there is an opening for extending the market to other counties, since much of the cheap Continental supply is inferior in quality and often largely adulterated.

Marketing

It must be distinctly understood that wholesale buyers are not willing to take small parcels from a number of sellers, but prefer to purchase by the cwt. or ton, and buy by sample, requiring the bulk to be up to sample, so far as regards appearance and quality.

In the case of herbs in the green state, these should be gathered late in the afternoon, so as to be sent off by night train and

arrive at their destination next morning, or they would be apt to heat and ferment and lose colour. They are usually packed loosely in $\frac{1}{2}$ cwt. bundles, and when possible in quantities of a ton or more, so as to fill a railway truck. Under present conditions, owing to the delay in railway traffic, they should be sent labelled through to their ultimate destination, and marked "Plants for Medicinal Use, Urgent." Supplies of fresh medicinal plants are usually contracted for in April and delivered in June and July. Dandelion root, however, is usually delivered in autumn.

It must be borne in mind that the trade in medicinal plants is a very curious one. Some herbs are required in quantities of many tons, and some only in a few cwts. But there are herbs used in proprietary preparations, which perhaps only one firm uses, but although that one might require a dozen cwts. only, or a dozen tons, it would not buy them through the ordinary trade channels, but from special growers, or in the way best calculated to keep its secret. It must also be remembered that every country has medicinal plants that cannot be so profitably grown elsewhere. Thus *Anemone Hepatica*, which grows on limestone hilly districts, is wanted at $4\frac{1}{2}d.$ a lb. for the dried leaves (which means 4 lb. of fresh leaves for that price). This can be done where the plant grows wild like a weed, but not otherwise. Similarly *Hydrastis canadensis*, which grows wild in Canada, and American Ginseng root (*Panax quinquefolium*), both of which fetch a high price, do not succeed well in this country, and even in the United States the cultivation is so difficult that the price is accordingly very high. We must be content to recognize that there are certain medicinal plants that cannot profitably be cultivated in England, and that these must be left to our Colonies to cultivate where the climate and conditions suit them.

If I may venture to offer a few suggestions to the members of the Herb-growing Association, they would be as follows:

There must be a Central Depôt where all parcels of dried herbs can be received, graduated as to quality, and put up in

uniform parcels of 7, 14, 28, or 56 lb. I believe such an arrangement is now being made.

There must be in connexion with the Dépôt a Bureau in touch both with producers and buyers, where it would be possible to take orders and execute them, and arrange prices and date of delivery. There needs to be published each month a Calendar of herbs procurable during the month, indicating the parts of the plants required, and containing directions how to grow or propagate such herbs as might be grown in small gardens. An Exchange column would also be useful for those who wish to exchange or purchase plants and seeds. The expense of such a publication should be met as far as possible by advertisements of sellers.

An expert competent to determine if the herbs sent in are rightly named and sufficiently dried, and in a saleable condition, is necessary.

Lastly, I would suggest that there is a large demand for culinary herbs, such as sage, mint, angelica, basil, thyme, and other sweet herbs in a dried state.

The only two possible ways, it appears to me, in which herb cultivation in small gardens could be made to pay would be, first, by increasing the quantity of any one culinary herb that suits the soil, drying it, and forwarding it to the Central Warehouse, where it could be used to form the large bales for wholesale trade. There is a far larger demand for dried and powdered culinary herbs for winter use than the public is aware of.

Secondly, by cultivation for seed. Thus, in a chalky garden, a few plants of Belladonna might be grown in a shady corner for the seed, and where Henbane will succeed it would be well worth while to save the seed from the largest plants. Similarly the seed of the Dalmatian insect-powder plant (*Pyrethrum cinerariaefolium*) should be saved for sale, also white poppy seed and some others, and where Chamomile produces double flowers it should be propagated for the sale of cuttings.

Questions put to the Lecturer, and his Answer

1. If not in possession of a kiln or other special apparatus of the nature mentioned in the lecture, what should be used?

Ans. Any drying-place will do, provided it has a current of hot air, such as an ordinary stove with hot air issuing from the top. The important point is rapidity, for the quicker the process of drying the better the colour of the product. A temperature from 80°-90° Fahr. up to 140° is sufficient for roots.

2. When, where, and how can seeds of Belladonna and Henbane be got?

Ans. It is impossible to get seeds now, though April is a good month to sow them when they are obtainable. Seeds must be collected in the summer and autumn from the wild plants.

3. Should dried herbs be kept in air-tight vessels?

Ans. Yes, or in paper in a dry room if the colour is to be preserved. If exposed to the ordinary atmosphere after drying they turn brown, and the absorption of moisture is as much as 12½ per cent.

*The Propagation of Medicinal Plants**

By Fred A. Miller



AN UNDERSTANDING of the best methods of propagating medicinal plants is essential to their successful cultivation. Their cultivation or commercial production is not a new industry, in fact certain phases of it are extremely old, though poorly developed. However long some of them have been continued under cultivation, there are still many phases of their propagation which have never been investigated. Repeated crop failures in the production of henbane in England have occurred during the past thirty years, and still the most recent reports continue to mention the uncertainty of germination without any attempt at explanation.

This condition is now changing, and the last few years have seen a more general and widespread interest in the thorough investigation of a rather selected list of drug plants than was hitherto experienced. The organized efforts of the United States Department of Agriculture are conducive to the continuation of this interest. England, Germany, and Austria have not been slow in following the example of the United States, and are now advocating the national support of comprehensive drug plant investigations.

The success of these investigations must of necessity depend upon the readiness with which supplies of seeds and plants can be obtained, and the ease with which they may then be propagated. The means of propagating medicinal plants need not differ in the main from those employed for other economic

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CULVER'S ROOT
VERONICA VIRGINICA

forms. Seedsmen, nurserymen, florists and gardeners all have their special and well-perfected systems of propagation for their respective classes of plants. The questions involved in these systems are not only those for increasing the number of individual plants, but also those involving the blooming and fruiting periods, harvests, markets, special crops, improvements, and breeding operations. Any method of propagation which does not augment these conditions is soon abandoned. Also, in the case of medicinal forms, the problems of propagation, though essential of solution, are only supplementary to other more valuable and interesting ones. The improvement of drug plants through selective breeding and hybridization, their successful cultivation upon a commercial scale, with the involved questions of practical and economic production, are more attractive, but in the end are all dependent upon successful propagation.

With medicinal plants it is many times difficult to obtain sufficient materials from which to propagate. Isolated, restricted, and many times unknown regions of production, make it almost impossible to obtain either seeds or plants. Even syndicates and sometimes government control have so monopolized these regions that they are practically inaccessible to the individual investigator. In an effort to obtain sufficient material with which to evolve certain problems upon the cultivation and improvement of the more valuable drug plants, difficulties were soon encountered in locating reliable sources of supply. Any study of the methods of propagation must therefore consist of, first, the obtaining or locating of suitable materials and, second, the various methods by which these may be successfully propagated and perpetuated. The first part of this discussion will, therefore, deal with probable sources of seeds and plants and the second with their propagation.

A thorough search has been made in an effort to locate the best and most probable sources for these materials. The results are given under the following five divisions:

- I. Commercial samples and shipments of crude drugs.
- II. Crude drug merchants,

III. Individuals living in or near producing regions, or others carrying on investigations with similar plants.

IV. Public and private botanical gardens, experiment stations and other institutions.

V. Commercial seedsmen and nurserymen.

A discussion of these sources together with results obtained follows in the foregoing order.

I

From commercial samples and shipments of crude drugs in which the aerial parts of the plants are used, germinable seeds are often obtainable. Many lots of drugs must be examined, however, and large numbers of questionable seeds examined and tested. In addition to furnishing material for planting, this procedure also serves as a valuable means of accurately identifying some crude drug of questionable origin. The age of seed from this source is always unknown and considerable time must be allowed for possible failures in germination. Among the forms of which seed may be obtained in this manner are American wormseed (*Chenopodium ambrosioides*), angelica (*Angelica atropurpurea*), anise (*Pimpinella Anisum*), arnica (*Arnica montana*), belladonna (*Atropa Belladonna*), broom tops (*Cytisus scoparius*), buchu (*Barosma betulina*), cannabis indica (*Cannabis sativa*), capsicum (*Capsicum fastigiatum*), caraway (*Carum Carvi*), cardamon (*Elettaria Cardamomum*), castor bean (*Ricinus communis*), celery seed (*Apium graveolens*), cevadilla (*Schoenocaulon officinale*), coca (*Erythroxylum Coca*), colchicum (*Colchicum autumnale*), colocynth (*Citrullus Colocynthis*), conium (*Conium maculatum*), coriander (*Coriandrum sativum*), fennel (*Foeniculum vulgare*), goats' rue (*Galega officinalis*), grains of paradise (*Amomum Melegueta*), henbane (*Hyoscyamus niger*), jumbul seed (*Abrus precatorius*), larkspur (*Delphinium Consolida*), Levant wormseed (*Artemisia pauciflora*), lobelia (*Lobelia inflata*), nux vomica (*Strychnos Nux-vomica*), parsley seed (*Apium Petroselinum*), passion flower (*Passiflora incarnata*), poppy heads (*Papaver somniferum*), scullcap (*Scutellaria lateriflora*), senna (*Cassia acutifolia* and *C. angustifolia*), serpentaria (*Aristolochia*

Serpentaria and *A. reticulata*), staphisagria (*Delphinium Staphisagria*), stramonium (*Datura Stramonium*).

Dermination tests have been made upon a number of the above forms as follows:

American wormseed.....	
Angelica.....	Fair germination.
Anise.....	
Arnica.....	Three tests. No results.
Belladonna.....	About 50 per cent germination.
Broom tops.....	No results.
Buchu.....	5 per cent germination.
Cannabis indica.....	100 per cent germination.
Caraway.....	
Cardamon.....	Two tests. No results.
Celery seed.....	
Cevadilla.....	One test. About 25 per cent.
Coca.....	Four tests. No results.
Colchicum.....	Three tests. About 5 per cent from one.
Colocynth.....	Most tests give from 5-10 per cent germination.
Conium.....	50 per cent germination or over.
Coriander.....	
Fennel.....	
Goat's rue.....	One test gave 5 per cent germination.
Grains of paradise.....	
Henbane.....	Most tests give 5 per cent germination, or more.
Larkspur.....	100 per cent from most tests.
Levant wormseed.....	No results from 2 tests.
Lobelia.....	
Nux vomica.....	No results from 5 tests.
Parsley seed.....	
Passion flower.....	One test gave 3 per cent germination.
Poppy heads.....	All tests gave 100 per cent germination.
Scullycap.....	One test out of three gave about 5 per cent germination.
Senna.....	Most tests gave fair germination.
Serpentaria.....	No results from 2 tests.
Staphisagria.....	One test gave 3 per cent germination.
Stramonium.....	All tests gave 50 per cent germination, or more.

Large numbers of seeds were used in most of these tests, and the conditions governing germination were varied to suit the requirements, in so far as they could be determined. It is to be noted that germination in most cases was low. Table IV gives details on most of these plants and on certain other miscellaneous drug plants.

II

Dealers in crude drugs will many times lend valuable assistance in searching for and supplying seeds and plants. Importers with foreign representatives and the foreign merchants themselves will sometimes request their agents and collectors to assist in such matters. No great diversity of forms, however, can be secured through these sources. They are restricted to those of which the seed constitutes the medicinal part, or to those in which the seeds are likely to appear with other plant parts. The forms thus obtainable are mostly included in the preceding list, though better seeds are sometimes furnished by the dealers upon special request for fresh material.

III

It is sometimes possible to locate individuals in different countries who have become interested in the collection of rare seeds and plants. Such sources are extremely questionable. While some individuals can furnish much good material, there are others who, though expressing much interest, cannot be depended upon to supply the proper species. Numerous instances of this have been recorded, an example of which may be noted where an enthusiastic druggist of Texas supplied fine specimens of *Monarda* for henbane, which he claimed was growing luxuriantly in his section of the state.

Local drug collectors may be considered here rather than with crude drug merchants. More strictly speaking, they are a class by themselves with many peculiarities and limitations. They are mostly illiterate persons, who take instructions poorly and disregard them when once in the field. A close personal association with many of them has revealed the fact that they are only capable of accurately identifying a very small number of medicinal plants. These usually occur among the monotypic genera and, when two or more closely related species are in question, are usually collected indiscriminately. One of the most intelligent collectors observed repeatedly brought in specimens of various species of *Asclepias*, upon requests

and instructions for *Apocynum cannabinum* and *Apocynum androsaemifolium*. *Apocynum cannabinum* when finally located was supplied upon request for both of the two species. Only recently a negro quack, who is held in high repute by the colored element of a considerable section, supplied *Apocynum androsaemifolium* upon request for *Veronica virginica*. Another form supplied for *Asclepias tuberosa* will have to be grown to maturity before it can be identified. One collector was shown spotted specimens of golden seal (*Hydrastis canadensis*), and stone root (*Collinsonia canadensis*), and failed to recognize either of them. Twin leaf (*Jeffersonia diphylla*) is repeatedly offered by local dealers for genuine golden seal. Both the leaf and root structures of these forms are quite distinct.

IV

In so far as their collections will permit, the botanical gardens and other similar institutions are of great value in supplying materials. Usually their collections of medicinal plants are comparatively small, but those which are obtainable are of high quality, and correctly classified. The liberal spirit of some of these stations is now restricted in some instances by government control. Such is the case with the buchu (*Barosma betulina*) of South Africa. To obtain seeds of this form direct from the Transvaal a long and tedious routine of grants, permits, etc., is necessary before they are allowed to be sent out of the country. On the other hand, such places as the Jamaica Public Gardens, Jamaica, the Kew Royal Gardens near London, England, the Royal Botanic Garden of Calcutta, India, the Botanic Garden and Museum of Natural History of Pará, Brazil, the Botanic Garden at Georgetown, British Guiana, and many others in foreign localities are usually willing to exchange or contribute materials for experimental purposes. Of no less distinction and willingness in this respect are the gardens at New York and St. Louis, the Office of Seed and Plant Introduction, and the Bureau of Plant Industry of the United States Department of Agriculture. However, it frequently happens that these excellent and widely separate

stations fail to have the materials desired. At present, this condition exists with some unusually desirable species of the genus *Artemisia*.

V

Commercial seedsmen and nurserymen have so far proven the best sources of supply, though they do not always maintain the highest standards of nomenclature. It is encouraging in this respect to note a growing tendency on their part to list more of their materials under the specific technical names. However, great numbers of varietal or trade names are annually introduced through these channels, which cause much confusion and uncertainty. Sooner or later many of these must be reduced to synonymy. Much time and energy is consumed in varietal tests for determining these synonyms, and any movement which will reduce their number must be greatly appreciated. What is most desired in this respect is the retaining of the native and introduced forms under their original names, or at least the recording of varieties in such a manner that the original parents can be traced, and the pedigrees of the supposed new forms accurately obtained.

The catalogues of the most prominent seedsmen and nurserymen from the United States, England, France, Germany, and Japan have been examined for medicinal plants. In such an examination it was necessary to have clearly in mind some means of deciding whether or not a given form should be classed medicinal or non-medicinal. Certain limitations must be exercised in such a distinction, and a conservative rather than a general attitude should be maintained. To follow the inclinations and suggestions of some authors would mean the consideration of an almost unlimited number of plants as possessing medicinal value. Practically, the list should not greatly exceed three hundred in number, and of these there are many included which are of doubtful value. In Bulletin, No. 2 California State Board of Forestry, entitled "Pharmaceutical Plants and Their Culture," there is a context of one hundred and fifty-four pages, eight of which treat of the cultivation of medici-

nal plants in California. A portion of this small space is given up to such forms as sage, horehound, rosemary, marjoram, and dandelion. The greater bulk of the publication is taken up with a list of "Native and Introduced Medicinal and Poisonous Plants." The inclusion in this list of such forms as sugar-maple, box-elder, maidenhair fern, common edible mushroom (*Agaricus campestris*), wind flower, columbine, pawpaw, banana, garden beet, clematis, persimmon, California poppy, strawberry, holly, lemon, puffball, sorrel, cinquefoil, yucca and even corn, can hardly be explained. If such plants as the foregoing are to be considered medicinal, the list of three hundred would quickly grow to six hundred or more.

Based upon such a liberal classification, all seedsmen and nurserymen could be said to list medicinal plants regularly, and in large numbers, while as a matter of fact they list but very few. Certainly such a classification is not advisable, from either a practical or a scientific standpoint. The list which has been used as a means of dividing this material into medicinal and non-medicinal contains three hundred and eighty different forms, and includes all those that are commonly used by prominent manufacturers of pharmaceutical preparations.

A LIST OF SEEDSMEN AND NURSERYMEN WHOSE CATALOGUES HAVE BEEN EXAMINED
FOR MEDICAL PLANTS, AND THE NUMBERS OF SUCH FORMS LISTED BY THEM

<i>Name of Firm</i>	<i>Location</i>	<i>Number Medicinal Forms Listed</i>
Bash-s Seed Store	Indianapolis Ind.	25
P. J. Berckmans Co.	Augusta, Ga.	20
A. T. Boddington	New York City	12
Bobbink & Atkins	Rutherford, N. J.	53
Benary, Ernst	Erfurt, Germany	68
Biltmore Nursery	Biltmore, N. C.	45
W. Atlee Burpee & Co.	Philadelphia, Pa.	18
California Nursery Co.	Niles, Cal.	26
Childs, John L.	Floral Park, N. Y.	17
Dreer, Henry A.	Philadelphia, Pa.	47
Elliot Nursery	Pittsburgh, Pa.	33
Ferry, D. M., & Co.	Detroit, Mich.	4
Fottler, Fiske, Rawson Co.	Boston, Mass.	17
Gillett, Edward	Southwick, Mass.	58
Glen St. Mary Nurseries	Glen St. Mary, Fla.	6

<i>Name of Firm</i>	<i>Location</i>	<i>Number Medicinal Forms Listed</i>
Gregory & Son	Marblehead, Mass.	3
Isaac House & Son	Bristol, England	5
Peter Henderson & Co.	New York City	21
Horsford's Nurseries	Charlotte, Vt.	35
Haage & Schmidt	Erfurt, Germany	158
Kelway & Son	Langport, England	10
Medical Nursery	Calcutta, India	50
Livingston Seed Co.	Columbus, Ohio	4
C. C. Morse & Co.	San Francisco, Cal.	8
T. V. Munson & Son	Denison, Texas	4
Monroe Nursery Co.	Monroe, Mich.	16
Henry Mette	Quedlinburg, Germany	58
Oregon Nursery Co.	Salem, Ore.	10
Roumanille Layfayette père & fils	St. Remy de Provence, France	28
John A. Salzer Seed Co.	La Crosse, Wisc.	27
J. M. Thorburn & Co.	New York City	52
Vaughan's Seed Store	Chicago, Ill.	35
Watkins & Simpson	London, England	24
J. D. Webster	Chichester, England	15
Yokohama Nursery Co.	Yokohama, Japan	6

Based upon the number of important species listed, method and accuracy of nomenclature, class of material and general attitude the above list could be reduced to nine as follows: Haage & Schmidt, Benary, Nette,* Medical Nursery, Gillett, Thorburn, Biltmore Nursery, Dreer, and Bobbink & Atkins. Materials have been obtained from five of these, and from eight of the others. The following discussion will consider not only the propagation of this material, but also such related problems as continued growth, productivity, commercial value, hardiness, habitat, and ease of transplanting, cultivating, and harvesting.

The methods of propagation have been those of standard use. Corbett (4) † divides these methods into the natural and artificial. The natural methods include reproduction by seeds, spores, rootstocks, stolons, suckers or root sprouts, bulbs, corms, and

*Mr. Miller's article was written before we went to war with Germany. The inclusion of this and other German firms dealing in medicinal plants among those from other countries is not likely to help enemy commerce and the comprehensive character of their collections should spur our own efforts in this direction.—ED.

† The numbers refer to a list of articles at the end of the paper.

tubers. The artificial methods consist in reproduction by cuttings, layering, grafting, and budding. Necessary adjuncts to all of these methods are suitable greenhouses, cold frames, hot beds, and open field accommodations.

Propagation from seeds has been practiced wherever possible, and must in nearly all cases precede other methods. Seed propagation, however practical it may be, will not serve all purposes. In breeding experiments and improvement selections, it is often very desirable to multiply individual specimens by other means. In breeding for the purpose of obtaining uniform strains is often a long and laborious method, while vegetative reproduction would give the same results in a shorter interval of time. Latent tendencies are more quickly and accurately eliminated, necessary seed production is avoided, as well as the saving of much time in seeding and transplanting.

Open field methods of seeding have been found impracticable and in many cases impossible with many medicinal forms. This condition necessitates a wide deviation from most normal methods of cropping and leads to the necessary development of specialized systems. Little of an agricultural nature has been developed with these forms. Farwell (8) says that belladonna, henbane, digitalis, and aconite can be grown as easily as potatoes. Turner (23) gives directions for growing henbane, which are too general to be of any value. Saunder's (19) statements on the germination of seeds of medicinal plants are general, and include no methods or actual data. Henkel (10) says that digitalis offers no difficulties in cultivation, and advises sowing in the open field or in seed beds. True (22) advocates open field planting of digitalis. Kraemer (13), in his brief notice on seed germination, discourages open field sowing. Open field sowings of henbane, belladonna and digitalis have been made for three successive years on well-prepared ground, and all have resulted in complete failures. Not enough plants for experimental purposes were obtained by the most careful attention.

Continued failures from open sowing of henbane are reported from England. Thirty years ago Holmes called attention to



PLEURISY ROOT
ASCLEPIAS TUBEROSA

the difficulties in the cultivation of henbane, He mentioned the uncertainty of the crop in England, and the peculiarities in the germination of the seed. Again (11) in 1905 he mentions the uncertainty of the crop. Ransom (17) in 1902 claims that it is difficult to obtain a good crop of this drug in Britain. Henkel (10) later calls attention to the uncertainty in seed germination. Turner (23) in his directions for growing henbane is encouraging in the extreme. In his opinion it is not a difficult crop to handle. Repeated tests in the open field have resulted in failures. Fair germination was obtained in one instance, but the seedlings could not compete with common weeds until large enough for cultivation. Seed tests carried on under glass indicate that germination is of high percentage, uniform and fairly regular for seeds from different sources.

With some of the older drugs in cultivation, propagation and cultural systems have been highly developed. Examples of this may be found in the excellent notes of Weddell (24) on the nurseries, cultivation, harvesting and curing of coca, of Lumsdaine (15) on the cultivation of nutmegs and cloves in Bencoolen, of Eatwell (7) on the methods of cultivation, collecting, and curing of opium, and the influence of soil and climate upon the yield and quantity of the product, and of DeVry (6) on cinchona.

There are few authentic data or directions, however, upon the propagation and cultivation of the more important forms which are adapted to this country. This list might well include such forms as belladonna, henbane, stramonium, digitalis, arnica, larkspur, valerian, santonica, veratrum, hellebore and others. It is evident that methods would have to be developed to suit the conditions of soil and climate, and at the same time be varied to meet the purposes of the work. That is, commercial production might be possible under a system which would be worthless for experiments on plant breeding and improvement.

In the following discussions the questions of propagation have been taken up in conjunction with other problems, and have only been developed as progress might demand. The

work has been done for the purpose of determining the practicability of growing certain drug plants upon a commercial scale, and the possibility of improving them through an application of the methods of plant breeding. All seed tests have been of a practical nature, and but little of the great mass of material upon the effects of various reagents and influences upon germination has been used. This material so far seems to have resulted in no new general laws applicable to commercial growers. Experiments upon the effects of light and darkness (Heinricher, 9) upon seed germination, temperature (Reynolds, 18) in relation to germination, treatment with warm water (Jensen, 12), sterilization of soil (Stone & Smith, 21), copper sulphate treatment (Bréal & Giustiniana, 2), electrical effects (Monahan, 16), soaking in chlorine water (Spat-schil, 20), soil temperature (Brown, 3), action of ether and chloroform (Becquerel, 1) and delayed germination (Crocker, 5), have resulted in many data but few generalizations. Specific gravity tests, sterilized soils and the sulphuric acid treatment (Love & Leighty, 14), have been used successfully and might be recommended for practical purposes. The forms under consideration and the results so far obtained are as follows:

Digitalis

More or less uncertainty exists as to the exact botanical source of this drug. The comparative medicinal value of the leaves from wild and cultivated forms, and the disputed methods of collection, curing and packing are unsettled questions of considerable importance. The comparative value of the many species and horticultural varieties, their ease of culture, relative yield of crude drug, their flowering periods, hardiness and duration of growth are additional problems which must be investigated before the genus can be made to yield its best to the manufacture of medicine.

Open field sowing was tried several times during two successive years. These tests were carried out both under practical field conditions and in ideally prepared seed beds. The results

were complete failures and open seed sowing under field conditions cannot be recommended. After this preliminary work, the open field methods were abandoned for the more reliable greenhouse methods.

Seeds of twenty-seven varieties were obtained for experimental plantings. These were germinated (see Table 1) in seed pans under glass, and transplanted to flats as soon as the second leaves were visible. These flats were retained in a cool greenhouse of 50 degrees night temperature, and 60 degrees day temperature, until March 1, when they were transferred to cold frames. The sashes of these frames were of double glass construction, and required little attention until the latter part of April. Then the sashes had to be removed during the day to prevent burning of the foliage, and to thoroughly harden off the young seedlings before transplanting to the field.

Transplanting to the open field was done mostly by inexperienced labor, and during dry weather accompanied by strong winds. The inexperienced labor was used as a means of determining the transplanting qualities of these forms, and the unfavorable weather only rendered this test more severe. After transplanting, the young plants were watered twice on consecutive days, and then left to the influence of natural conditions. Cultivation was commenced early, and repeated frequently throughout the growing season. The soil was a poor stiff, clay loam, but all forms of the *digitalis* made excellent growth, as is evidenced by the amount of dry leaf produced by some average individual plants. Some of these yielded as follows:

Digitalis maculata Iveryana, a strong and robust form, 392 grams, *Digitalis gloxiniodides* 170 grams, *Digitalis Ivery's* spotted 209 grams, and *Digitalis alba* 1721 grams. In obtaining the comparative yield (see Table 1) of all the varieties, ten average plants were selected, and all the leaves collected from them, and thoroughly air dried. The figures representing comparative yield of *Digitalis alba*, *D. purpurea* and *D. canariensis*, Watkins; *D. sibirica*, *D. lanata*, and *D. ambigua*, Horsford; and *D. gloxiniaeflora rosea*, Dreer, are all low on account



A MILKWEED SOMETIMES
COLLECTED BY MISTAKE FOR
PLEURISY ROOT

of early collection. Those for the other forms, however, are accurate enough for all practical purposes. The comparative toxicity as given in the table is based upon figures obtained by the one hour frog heart method for testing *Digitalis* and its preparations. The value "one" represents the greatest toxicity, while the one numerical increase indicates a proportional decrease in toxicity. Thus the weakest sample tested (*Digitalis gloxiniae-flora alba*) has a toxicity of 6.3.

Another object of the *Digitalis* study was to test the effects of hybridization upon medicinal value. For this work, it was very desirable to bring the various species and varieties into flower as soon as possible. Early seed sowing augmented by a rather rapid growth in the greenhouse and by a slow hardy growth in the cold frames, as well as by a late and unusually favorable season, resulted in a number of flowering plants from several species and varieties (see Table II). For the purpose of obtaining early flowering plants upon which to begin the work of inbreeding and hybridization, a number of one year old plants were purchased from A. T. Boddington. These began flowering early, and furnished material throughout the season. Various combinations were tried, a number of which were successful, and seedlings are already being propagated in an effort to bring them into flower the first year. Thus any breeding operations can be annually continued or discontinued as the results may indicate, whereas these forms under the usual conditions of propagation would require two years to reach maturity.

It has also been noted that a small number of annual forms have appeared in the late plantings of several species and varieties, and especially where large numbers of plants were used. In all cases these have been inbred. The resulting progeny of these inbred annuals will be closely observed for the reappearance of annual forms.

Root division and propagation of lateral buds have both been tried with several varieties of *Digitalis* (see Table III). It was hoped that clonal varieties could be obtained in this manner. Uniformity of individuals and their behavior to

varied soil and climatic conditions could then be studied with greater accuracy. Lateral buds, with and without roots, were carefully removed. Those removed during summer, fall and winter were extremely hard to start, whether they bore roots or not. Sand proved to be the best material for this purpose. However those made in early spring from plants left in the open have yielded a large percentage of plants. Side cuttings, with and without roots, made February 21, 1913, had rooted in sand in the greenhouse March 20, 1913.

Belladonna

The propagation of belladonna was first attempted through open field sowing. Successive trials under varied field conditions with seed from several different sources resulted in complete failures. Fall sowing of imported seed upon a carefully prepared seed bed gave the following result. Seed planted September 3, 1912, fair germination October 21, 1912. Seed collected from growing plants August 15, 1912, planted September 3, 1912, fair germination October 21, 1912.

Greenhouse conditions were then tried, which were practically the same as those for digitalis, except that the seed pans used were more carefully protected from alternate degrees of moisture and dryness. See Table IV for germination data, and Tables V and VI for the influence of certain seed treatments upon germination.

The belladonna seedlings transplant with considerable ease and with practically no loss. Damping off is not so frequent as with digitalis and henbane. Sterilized soil and careful watering greatly reduce this trouble in all cases. The belladonna seedlings were retained in the greenhouse in flats until well established, and were then transferred to the cold frames. This was done on some occasions as early as March 19. Observations at this time showed a temperature of 46 degrees inside the frames, with the outside temperature below freezing. Outside night temperatures of 18 degrees caused no injury to the seedlings under the unprotected double glass sash. Seedlings

transplanted directly into the frames in stiff clay soil made slower growth than those in the better soil of the flats, but produced hardier and more stalky plants, which transplanted to the open with much greater ease and certainty. They also made better subsequent growth than those in the flats. They required much less attention while in the frames, having to be watered only occasionally, while those in the flats dried out rapidly as the season advanced, and demanded considerable attention. Seedlings retained in the greenhouse in flats until May 10 were tender and succulent and wilted badly when transferred to the open field. From thirty to forty per cent were lost during this second transplanting, while with those from the cold frames this loss was scarcely appreciable.

The successful propagation of the belladonna plant was only a necessary preliminary procedure to other more important problems. It was desired to observe this form under cultivation, to study its commercial production and the possibilities of developing a strain which would produce a uniformly higher yield of alkaloids than the ordinary commercial drug.

The first of these problems was accomplished through seed propagation. No difficulty was experienced in obtaining an abundance of plants after indoor methods of propagation were adopted. Large luxuriant plants were obtained from seed sown March 8, 1912, and were flowering by July 12. It is interesting to note here that the plants which had been transplanted directly from the seed pans to the poor soil in the cold frames were the first plants to commence flowering. The plants at this time (July 12) were from two to three feet tall, and much branched. Ransom (17) says that belladonna grown in England from seed sown in early spring produces little if any herb worth cutting the first year.

It is now believed that two profitable harvests can be obtained during one growing season, from plantings made January 1st of the same year. The belladonna plant is an herbaceous perennial, but on account of its susceptibility to winter killing in this climate, it may have to be grown as an annual. 1724 plants were left in the open without protection as a test for



GOLDEN-SEAL
HYDRASTIS CANADENSIS

hardiness and as a means of obtaining individual plants of unusual hardiness from which to develop a strain more adapted to this climate. September 24 the entire herbaceous portion was removed from 1414 of these plants, the remaining 310 being left undisturbed. Twelve clumps of roots were lifted November 7, 1912, and placed in the cold frames with no protection except the double glass sash. The sash was put on at this time, and left closed until March 31, 1913, when the plants were first observed. At this time they were all bearing vigorous sprouts. Those left in the open were showing no growth on this date. These were again observed May 1, and the following conditions noted:

Number of plants, from which herbaceous portion had been removed, showing growth, 44.

Number of plants, which had been left undisturbed, showing growth, 307.

The second object of the belladonna investigation, viz., the attempt to produce a strain which would yield a uniformly higher percentage of alkaloids than the commercial drug, involves another method of propagation. In this case, individual plants must be examined for their property of yielding certain percentages of alkaloids. It is desirable to propagate promising individuals in such a manner that the high yielding character will be uniformly transmitted to the offsprings. As yet it is not known how such a character behaves. Alkaloids are not essential products of metabolism, and the inheritance of the property of producing a large percentage of such products is indeed questionable.

To investigate this point, both seed and vegetative propagation of pure strains must be practiced. The behavior of the character in these pure strains and their progeny will throw much light on the possibility of developing, propagating, and maintaining high yielding varieties through the practice of breeding.

If the property of an individual plant to produce a definite amount of alkaloids when grown under uniform conditions, behaves in the same manner as many external characters, the

propagation of pure bred strains by the vegetative method should yield uniformly according to selection.

To test this possibility, it was necessary to follow the methods of the florist in the propagation of cuttings in sand. This was done both in the greenhouse and in the open under cheese-cloth shade. In the greenhouse the open sand bed was tried as well as the glass-covered bed recommended by Bailey. The open bed was also tried, with the cheese cloth shade. The best results in the greenhouse were obtained with the open bed under the influence of a mild bottom heat, and very careful watering. Sterile sand had to be used to prevent a total loss of the cuttings from the attack of a very small white worm, which fed on the lower ends of the cuttings, and prevented callousing until decay would commence. The best outdoor results were obtained from the use of the cold frames protected with cheese-cloth shades. Top cuttings made from the more mature wood of the open grown plants strike root more readily than those from the tender succulent wood of plants grown in the greenhouse.

Table III gives results obtained by the vegetative method of propagation for belladonna and other miscellaneous forms. Open field seeding has been found practical for such forms as stramonium (*Datura Stramonium*), cannabis indica (*Cannabis sativa*), larkspur (*Delphinium Consolida*), and lappa (*Arctium Lappa*). This list can probably be greatly enlarged as other forms are tested.

Various species and varieties of the genus *Datura* are being investigated in the same manner as belladonna and digitalis. Fifty individual plant assays have been made from plantings of *Datura Stramonium* and *Datura Tatula*. These indicate that the application of plant breeding methods to the improvement of medicinal plants may be successful, and extremely practicable. Averages of 50 per cent and 60 per cent have been obtained from the progeny of selected parent plants of *Datura Stramonium* and of 49 per cent and 62 per cent from *Datura Tatula* as compared with averages of 28 per cent and 35 per cent obtained respectively from wild plants of these two species. Individual plants have been found which essay as high as 65 per cent for

the *D. Stramonium* and 77 per cent for *D. Tatula*. Such individuals are used for propagating purposes. Again, as in the case of belladonna, it is a question of inheritance that must determine the method of propagation or the advisability of attempting to perpetuate these high yielding individuals for commercial purposes.

In the foregoing, propagation has only been considered as a necessary preliminary procedure to other more comprehensive problems. A sufficient number of methods for propagating various classes of plants has been developed to suit the present need of medicinal plant growers. These have been largely the result of certain demands upon well-established horticultural forms, and their extended use is only a matter of application.

Their application herein described has furthered investigations not otherwise possible. The results obtained from their application, the continuation of other related problems, and the objects in view, have all been stated. The related problems such as commercial production, the testing of different species and varieties, and their improvement by breeding and selection, have an unquestionable economic value, the solution of which will lend much to the demands for better and more precise medicinal products.

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SPECIES OR VARIETIES	SOURCE	DATE PLANTED	DATE GERM-NATED	PER CENT GERMI-NATION	DATE FIRST TRANS-PLANT-ING	NUMBER PLANTS USED	DATE SECOND TRANS-PLANT-ING	NUMBER TRANS-PLANTED TO FIELD	NUMBER OF SEED-SON, 10-31-12	SAMPLES COL-LECTED	PER CENT LOSS IN DRYING	COMPAR-ATIVE YIELD OF DRY	COMPAR-ATIVE TOX-ICITY
		1912	1912		1912		1912			1912		\$74MS	
<i>Digitalis purpurea rosea</i>	Boddington	2-6	2-15	90	3-13	440	5-20	396	358	9-15	82	1,845	1.3
<i>Digitalis purpurea rubra</i>	Boddington	2-6	2-15	70	3-13	330	5-21	264	226	9-15	82	1,656	1.5
<i>Digitalis lan-ida</i>	Boddington	2-6	2-19	60	3-12	209	5-25	88	87	9-19	76	1,008	1.0
<i>Digitalis Ivey's spotted</i>	Ferry	2-29	3-11	60	3-29	330	5-24	264	244	10-11	86	2,090	1.8
<i>Digitalis mixed</i>	Salzer	3-7	3-18	90	4-2	330	5-25	176	153	10-18	82	1,755	2.5
<i>Digitalis sp</i>	Yokohama	3-5	3-18	80	4-5	330	5-23	264	239	10-18	81	1,495	3.0
<i>Digitalis lutea</i>	Benary	3-22	4-1	60	4-11	330	5-22	264	256	11-1	70	2.1	554
<i>Digitalis macranthus</i>	Benary	3-22	4-1	70	4-11	330	5-23	264	231	11-1	67	2.6	430
<i>Digitalis Buxbaumii</i>	Benary	3-22	4-1	70	4-10	330	5-23	264	233	11-1	74	1.6	994
<i>Digitalis purpurea maculata su-perba</i>	Benary	3-22	4-1	60	4-11	330	5-25	176	168	11-1	77	1.6	1,36
<i>Digitalis purpurea</i>	Oregon	2-19	3-1	60	4-1	1,390	5-10	1,300	952	7-14	76	3.0	425
<i>Digitalis alba</i>	Watkins	11-22	12-1	90	1-30	345	5-20	264	193	7-25	78	2.3	391
<i>Digitalis purpurea</i>	Watkins	1912	1912	90	1-30	351	5-25	88	83	7-25	80	3.0	312
<i>Digitalis canariensis</i>	Watkins	1-4	1-15	70	2-15	440	5-21	264	244	8-15	47	1.6	266
<i>Digitalis monstrosa</i>	Watkins	2-7	2-15	80	3-15	440	5-20	396	349	9-15	84	2.6	1,450
<i>Digitalis sibirica</i>	Horsford	2-8	2-19	80	3-11	220	5-21	396	380	7-28	72	1.8	149
		1911	1911										
<i>Digitalis lanata</i>	Horsford	12-20	12-28	40	2-6	99	5-25	176	173	7-28	76	1.3	219
<i>Digitalis ambigua</i>	Horsford	12-21	12-29	40	2-14	200	5-21	264	243	7-29	66	1.8	173
		1912	1912										
<i>Digitalis gloxinoides</i>	Horsford	2-7	2-16	80	3-4	450	5-20	616	552	9-16	82	1.5	1,850
<i>Digitalis gloxiniaeflora rosea</i> ...	Deer	1-8	1-19	80	2-15	100	5-20	264	213	8-19	74	2.0	664
<i>Digitalis monstrosa</i>	Deer	2-7	2-15	90	3-1	511	5-20	428	394	9-15	82	1.8	1,645
<i>Digitalis grandiflora</i>	Deer	2-7	2-19	60	3-27	330	5-24	264	220	9-19	68	3.0	351
<i>Digitalis maculata Ivoryana</i>	Boddington	1-17	1-25	80	2-13	333	5-21	264	228	8-35	84	1.6	1,050
<i>Digitalis gloxiniaeflora pur-pura</i>	Boddington	1-30	2-10	70	3-7	440	5-20	352	318	9-10	84	1.5	1,815
<i>Digitalis gloxiniaeflora lutea</i> ...	Boddington	1-3	2-13	60	3-6	440	5-22	264	262	9-13	74	1.6	882
<i>Digitalis gloxiniaeflora lilicina</i> .	Boddington	2-6	2-14	80	3-8	440	5-22	308	272	9-14	80	1.6	1,715
<i>Digitalis gloxiniaeflora alba</i>	Boddington	2-6	2-15	80	3-16	330	5-24	308	224	9-15	82	6.3	1,475
<i>Digitalis purpurea alba</i>	Boddington	2-6	2-15	80	3-12	440	5-20	396	334	9-15	84	1.6	1,855

TABLE III

PROPAGATION BY CUTTINGS

NAME	SOURCE	NUMBER STARTED	DATE STARTED	NUMBER ROOTED	DATE ROOTED	METHOD
Belladonna.....	Field plants	26	1912 7-31	0	1912	Greenhouse, open sand bed
Belladonna.....	Field plants	17	8-3	1	8-19	Greenhouse, open sand bed
Belladonna.....	Field plants	24	8-1	0		Greenhouse, open sand bed
Belladonna.....	Greenhouse plants	76	5-14	73	6-6	Greenhouse, bottom heat
Belladonna.....	Greenhouse plants	25	8-1	0		Greenhouse, bottom heat
Belladonna.....	Greenhouse plants	35	8-14	0		Greenhouse, bottom heat
Coleus control.....	Greenhouse plants	6	8-14	4	8-26	Greenhouse, bottom heat
Coleus control.....	Greenhouse plants	19	8-22	0		Greenhouse, bottom heat
Coleus control.....	Greenhouse plants	28	8-22	0		Greenhouse, bottom heat
Coleus control.....	Greenhouse plants	5	1-30	0		Greenhouse, bottom heat
Coleus control.....	Greenhouse plants	121	1-22	0		Greenhouse, glass covered bed
Coleus control.....	Greenhouse plants	49	1-29	0		Greenhouse, open sand bed
Coleus control.....	Greenhouse plants	42	1-29	0		Greenhouse, open sand bed
Coleus control.....	Field plants	220	9-4	107		Cold frames, cheese cloth shades
Coleus control.....	Field plants	180	9-6	101		Cold frames, cheese cloth shades
<i>Digitalis canariensis</i>	Field plants	50	6-10	19	6-29	Greenhouse, open sand bed
<i>Digitalis canariensis</i>	Field plants	40	7-13	0		Greenhouse, cheese cloth shade
<i>Digitalis canariensis</i>	Field plants	21	7-31	0		Greenhouse, open sand bed
<i>Cytisus scoparius</i>	Greenhouse plants	20	5-8	12	6-29	Greenhouse, open sand bed
<i>Cytisus scoparius</i>	Greenhouse plants	55	6-29	30	8-30	Greenhouse, open sand bed
Nasturtium control.....	Greenhouse plants	7	6-29	6	7-8	Greenhouse, open sand bed
<i>Cereus grandiflorus</i>	Crude drug	36	6-5	13	6-29	Greenhouse, open sand bed
Marshmallow.....	Field plants	11	7-31	11	8-19	Greenhouse, open sand bed
<i>Solanum Dulcamara</i>	Field plants	7	8-5	4	8-30	Greenhouse, open sand bed
Vanilla.....	Greenhouse plants	21	6-20	14	8-20	Greenhouse, open sand bed
<i>Digitalis</i>	Field plants	6	2-21	4	3-18	In sand under bell glass

TABLE IV
SEED GERMINATION

NAME	SOURCE	DATE PLANTED	DATE GERMINATED	GERMINATION	CONDITIONS
<i>Atropa Belladonna</i>	Greenhouse	12-21-11	1-24-12	Good	Greenhouse
<i>Atropa Belladonna</i>	Comm. sample	12-11-11	1-26-12	Uneven—fair	Greenhouse
<i>Atropa Belladonna</i>	Greenhouse	1-4-12	2-9-12	Good	Greenhouse
<i>Atropa Belladonna</i>	Comm. Lot.	2-9-12	3-1-12	Fair	Greenhouse
<i>Atropa Belladonna</i>	Comm. Lot.	2-19-12	3-8-12	Poor	Greenhouse
<i>Atropa Belladonna</i>	Derp. Agri.	1-10-12	2-20-12	Very good	Greenhouse
<i>Atropa Belladonna</i>	D. pt. Agri.	2-20-12	3-10-12	Fair	Greenhouse
<i>Atropa Belladonna</i>	Aug. and Geo. Fischer	2-26-12	3-21-12	Good	Greenhouse
<i>Atropa Belladonna</i>	Cult. plants	12-24-12	12-20-12	Good	Greenhouse
<i>Atropa Belladonna</i>	Haag and Schmidt	2-2-13	3-23-13	Poor	Greenhouse
<i>Atropa Belladonna</i>	Select plant	2-25-13	3-19-13	Poor	Greenhouse
<i>Atropa Belladonna</i>	Select plant	2-25-13	3-19-13	Poor	Greenhouse
<i>Atropa Belladonna</i>	Select plant	2-25-13	3-19-13	Poor	Greenhouse
<i>Atropa Belladonna</i>	Select plant	2-25-13	3-27-13	Poor	Greenhouse
<i>Atropa Belladonna</i>	Select plant	2-25-13	3-27-13	Poor	Greenhouse
<i>Atropa Belladonna</i>	Aug. and Geo. Fischer	9-3-13	10-21-12	Fair	Open field
<i>Atropa Belladonna</i>	Cultivated plants	9-3-12	10-21-12	Fair	Open field
<i>Nicandra physaloides</i>	Haag and Schmidt	2-22-12	3-7-12	Good	Greenhouse
<i>Hyoscyamus niger</i>	Benary	2-22-12			
<i>Hyoscyamus niger</i>	Benary	3-22-12	4-3-12	Fair	Greenhouse
<i>Hyoscyamus niger</i>	Aug. and Geo. Fischer	3-22-12			
<i>Hyoscyamus niger</i>	Aug. and Geo. Fischer	2-12-12	2-23-12	Good	Greenhouse
<i>Hyoscyamus niger</i>	Aug. and Geo. Fischer	2-7-12	2-14-12	Good	Greenhouse
<i>Hyoscyamus niger</i>	Haag and Schmidt	2-25-12		No result	Greenhouse
<i>Hyoscyamus niger</i>	Haag and Schmidt	2-7-12		No result	Greenhouse

<i>Hyoscyamus niger</i>	Yokohama, Japan	2-25-12	3-20-12	Fair	Greenhouse
<i>Hyoscyamus niger</i>	Yokohama, Japan	3-14-13	4-3-13	Poor	
<i>Hyoscyamus</i> sp.	Watkins and Simpson	5-5-13		No result	Greenhouse
<i>Hyoscyamus annualis</i>	Cultivated plant	5-3-13	3-27-13	Good	Greenhouse
<i>Hyoscyamus orientalis</i>	Haag and Schmidt	2-10-13	2-27-13	Poor	Greenhouse
<i>Hyoscyamus muticus</i>	Wheeler and Son	2-24-13	3-8-13	Fair	Greenhouse
<i>Hyoscyamus muticus</i>	Aug. & Geo. Fischer	3-20-12		No result	Greenhouse
<i>Hyoscyamus</i> sp.	Vaughn	4-15-10		No result	Greenhouse
<i>Glycyrrhiza glabra</i>	Haag and Schmidt	4-30-12	5-9-12	Very poor	Greenhouse
<i>Glycyrrhiza glabra</i>	Haag and Schmidt	12-24-12	1-2-13	Poor	Greenhouse
<i>Bryonia alba</i>	Haag and Schmidt	12-24-12		No result	Greenhouse
<i>Bryonia dioica</i>	Haag and Schmidt	12-24-12		No result	Greenhouse
<i>Cinchona officinalis</i>	Haag and Schmidt	2-8-13	3-28-13	Poor	Leaf mould
<i>Cinchona Calisaya</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Cinchona succirubra</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Erythroxylum Coca</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Veratrum album</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Veratrum viride</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Veratrum nigrum</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Colchicum autumnale</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Gentiana lutea</i>	Haag and Schmidt	2-8-13		No result	Leaf mould
<i>Laurus Cinnamomum</i>	Haag and Schmidt	2-10-13		No result	Greenhouse
<i>Santalum album</i>	Haag and Schmidt	2-10-13		No result	Greenhouse
<i>Strychnos Nux-vomica</i>	Haag and Schmidt	2-10-13	2-18-13	No result	
<i>Convolvulus Scammonia</i>	Haag and Schmidt	2-10-13	3-28-13	Poor	
<i>Citrullus colocynthis</i>	Haag and Schmidt	2-10-13		Pt. or	
<i>Piper nigrum</i>	Haag and Schmidt	2-10-13		No result	No result
<i>Quillaia Saponaria</i>	Haag and Schmidt	2-10-13		No result	No result
<i>Scilla maritima</i>	Haag and Schmidt	2-10-13		No result	No result
<i>Aloe ferox</i>	Haag and Schmidt	2-10-13		No result	No result

TABLE IV (Continued)
SEED GERMINATION

NAME	SOURCE	DATE PLANTED	DATE GERMINATED	GERMINATIONS	CONDITIONS
<i>Archangelica officinalis</i>	Haag and Schmidt	3-14-13		No result	Greenhouse
<i>Anthemis nobilis</i>	Haag and Schmidt	3-14-13	3-19-13	Good	Greenhouse
<i>Arnica montana</i>	Haag and Schmidt	3-14-13	3-21-13	Fair	Greenhouse
<i>Levisticum officinale</i>	Haag and Schmidt	3-14-13		No result	Greenhouse
<i>Pyrethrum cinerifolium</i>	Haag and Schmidt	3-14-13	3-24-13	Good	Greenhouse
<i>Carlthamus tinctorius</i>	Haag and Schmidt	3-14-13	3-18-13	Good	Greenhouse
<i>Foeniculum vulgare</i>	Haag and Schmidt	3-14-13	3-24-13	Good	Greenhouse
<i>Eleteria Cardamomum</i>	Comm. Sample	12-27-12		No result	Greenhouse
<i>Delphinium Staphisagria</i>	Comm. Sample	12-27-12	1-20-13	Poor	Greenhouse
<i>Grindelia robusta</i>	U. S. Dept. Agr.	2-11-13	2-15-13	Good	Greenhouse
Insect flowers.	Comm. Lot	2-11-13		No result	Greenhouse
<i>Strophanthus</i> sp.	Comm. Lot	2-19-13		No result	Greenhouse
<i>Strophanthus</i> sp.	Comm. Lot	2-19-13	3- 5-13	Poor	Greenhouse
<i>Althaea officinalis</i>	U. S. Dept. Agr.	2-22-13	3- 5-13	Good	Greenhouse
<i>Berberis Aquifolium</i>	Commercial	3-10-13	4- 3-13	Fair	Greenhouse
<i>Conium</i> sp.	Comm. Lot	5- 5-13	3-20-13	Good	Greenhouse
<i>Theobroma Cacao</i>	Jamaica	3-14-13		No result	Greenhouse
<i>Valeriana officinalis</i>	Dreer	3-27-13		Good	Greenhouse
<i>Apium Petroselinum</i>	Comm. Lot	4- 4-13	4-17-13	Good	Greenhouse
<i>Anonum Madageta</i>	Comm. Lot	4- 4-13		No result	Greenhouse
<i>Apium graveolens</i>	Comm. Lot	4- 4-13	4-16-13	Good	Greenhouse
<i>Coriandrum sativum</i>	Comm. Lot	4- 4-13	4-18-13	Good	Greenhouse
<i>Chenopodium ambrosioides</i>	Comm. Lot	4- 4-13	4-21-13	Good	Greenhouse
<i>Carum Carvi</i>	Comm. Lot	4- 4-13	4-17-13	Fair	Greenhouse
<i>Delphinium Staphisagria</i>	Comm. Lot	4- 4-13		No result	Greenhouse

<i>Lobelia inflata</i>	Comm. Lot	4-4-13		No result	Greenhouse
<i>Foeniculum vulgare</i>	Comm. Lot	4-4-13		No result	Greenhouse
<i>Foeniculum vulgare</i>	Comm. Lot	4-4-13		No result	Greenhouse
<i>Schoenocaulon officinale</i>	Comm. Lot	4-4-13		No result	Greenhouse
<i>Pimpinella Anisum</i>	Comm. Lot	4-4-13		No result	Greenhouse
<i>Citrullus Colocynthis</i>	Comm. Lot	5-1-12		No result	Greenhouse
<i>Aristolochia Serpentaria</i>	Comm. Lot	5-2-12		No result	Greenhouse
<i>Schoenocaulon officinale</i>	Comm. Lot	5-2-12	7-8-12	Poor	Greenhouse
<i>Anomum Melegueta</i>	Comm. Lot	5-8-12	5-20-12	Fair	Greenhouse
<i>Strophanthus</i> sp.	Comm. Lot	5-8-12			Greenhouse
<i>Datura ferax</i>	Haag and Schmidt	5-28-12	6-4-12	Good	Greenhouse
<i>Strophanthus Kombe</i>	Comm. Sample	6-18-12			Greenhouse
<i>Strophanthus hispidus</i>	Comm. Sample	6-18-12			Greenhouse
<i>Citrullus Colocynthis</i>	Comm. Sample	6-18-12	7-8-12	Poor	Greenhouse

TABLE V
EFFECT OF SEED AND SOIL TREATMENT ON GERMINATION

NAME	DATE PLANTED	DATE GERMINATED	GERMINATION	TREATMENT
Belladonna.....	2-6-12	3- 2-12	Good	Water
Belladonna.....	2-5-12	3- 5-12	Good	Warm water
Belladonna.....	2-7-12	2-26-12	Very good	Warm water
Belladonna.....	2-7-12	2-26-12	Very good	Warm water
Belladonna.....	2-5-12	3-25-12	Good	Warm water
Belladonna.....	2-6-12	3- 2-12	Poor	Untreated

TABLE VI
CONCENTRATED SULPHURIC ACID TREATMENT FOR BELLADONNA

	PLANT- ED	GERM.	NO. SEED- LING	DATE	NO. SEED- LING	DATE	NO. SEED- LING	DATE	NO. SEED- LING	DATE	NO. SEED- LING
	1913	1913		1913		1913		1913		1813	
Untreated.....	2-14			3-13	3	3-19	3	3-28	14	4-8	24
Treated 5 mi.....	2-14	3-5	2	3-13	4	3-19	10	3-28	27	4-8	36
Treated 10 mi.....	2-14	3-5	3	3-13	11	3-19	46	3-28	125	4-8	138
Treated 15 mi.....	2-14			3-13	3	3-19	15	3-28	32	4-8	31

Notes on *Cotoneasters*

By John Dunbar



COTONEASTERS are unfamiliar shrubs in a great many gardens. Many of them are highly ornamental in habits, flowers, and fruits. Their habits are exceedingly variable. Some of the species are low trailing shrubs, and many of them are spreading, broad-headed shrubs from ten to fifteen feet in height. All of the species should be planted in well drained soil, and preferably in positions sheltered from the sweep of the prevailing cold winds.

Mr. E. H. Wilson introduced a number of new species from Western China to the Arnold Arboretum, and most of them are proving to be very ornamental in gardens and parks where they have been tested.

Cotoneaster acutifolia is an erect growing shrub with the branches slightly spreading. The leaves are about two inches long, nearly smooth, and dark green when mature. The ovoid black fruits are quite conspicuous in the autumn.

Cotoneaster amoena is an intricately branched shrub. The branchlets are thickly covered with the small leaves, deep green above whitish beneath, and from one-half inch to three-quarters of one inch long, and are persistent until midwinter. The clusters of showy red fruits are produced in great abundance and are conspicuous from September until the end of November.

Cotoneaster divaricata is an upright growing shrub with the branches somewhat intricate. The leaves are small, not over one inch in length, but they are thickly set on the branchlets and deep glossy green. The bright fruits on short stalks are particularly showy in September and October. The foliage usually assumes a bright orange red color in the autumn.

Cotoneaster Dielsiana has spreading and drooping branches.

The leaves are usually from three-quarters of one inch to one inch long, and cover the branches thickly, and are pale green in color. The subglobose red fruits ripen in September and are showy until the end of October. With its gracefully pendant branches this species is highly ornamental.

Cotoneaster foveolata is a rapid growing robust shrub, with spreading branches. The dull green leaves are from two to three inches long. The black subglobose fruits are ripe in September. The most ornamental feature of this species is the bright orange-red color of the foliage in the autumn.

Cotoneaster Franchetti is a charming species. The branches are spreading and gracefully drooping. The leaves are usually about one and a half inches long, pale green above, whitish beneath. The scarlet to orange-red fruits are particularly showy in September to the end of November. The foliage is persistent until December or later. This is one of the most ornamental species of the genus.

Cotoneaster Henryana is a shrub with branches semi-prostrate, and leaves about three inches long, deep green and rugose above. The fruit is said to be red, but it has not yet produced fruits with us. It is very ornamental in its spreading habit.

Cotoneaster multiflora is a slender branched shrub with the branches slightly arching. The deep green leaves are from one and one-half to two inches long. The numerous clusters of white flowers are quite conspicuous in this species about the end of May. The red fruits are interesting in September and October, but not as showy as in some other species.

Cotoneaster salicifolia is a most interesting species with spreading pendulous branches. It is said to ultimately attain a height of fifteen feet, but with us it shows no tendency to attain any such height. The leaves are from two to two and one-half inches long and are persistent until mid-winter. The subglobose fruits are bright red, and are ornamental in October until December, and beneath the snow retain their color until mid-winter.

Rochester.



COTONEASTER MICROPHYLLA
FOR WALL PLANTING

Why a Garden?

By Ralph Rodney Root



GARDEN has much the same relation to landscape architecture as the design and building of houses has to architecture. Few architects specialize in house work and few landscape men specialize in garden work. The architect must get the large buildings and the land-



VILLA D'ESTE

scape man must design the parks and solve the larger problems of landscape gardening. This does not mean that the problem of house design is not as complex a one as the other problems of architecture, nor that the problem of garden design is not as complex a one as other landscape problems, but the conditions under which the professions are working makes the work in these fields not as attractive as in the others.

People in Amer-

ica are ever talking of democracy in landscape gardening as if bare lawns, no privacy in the out-of-doors, and uninteresting architecture, mean democracy. It seems to me that democracy means rather that we are to have freedom, at least in our home life. There are certain principles that every one must agree to, but we are also supposed to have, first of all, a chance to develop individuality. In place of giving up all of the ground about the house to the street view, let us keep a small part of it ourselves for the family use. The typical American city street, with open lawns and tree shaded walks, gives a certain sense of freedom that I should hate to see lost, but we can still keep these and have our gardens arranged so as to extend the house plan into the home grounds. The well designed garden, from carefully studied plans, will always give more enjoyment than the haphazard lawn in which an attempt has been made to demonstrate wild nature, or in which no attention has been given to the possible enjoyment of out-of-door life.

The problem of house and garden design is one that to be successfully solved must be solved by the architect and the landscape man, working together. The plan which will include both the floor plan and the garden plan, to be successful must be the result of coöperation. The one great thing that the two have in common, is the fundamental of all art, design. Design is first of all, arrangement. The successful solution of every problem has first to do with the plan. Design in the plan is such an arrangement of the several units as to make it a whole, rather than a haphazard collection of parts. A slice of woodland and a sundial or fountain, with a row of stepping stones about it is not design. Whether the garden is large or small, the same fundamental principles of composition must be followed. In any garden, there will arise questions to which you must find the answer. What is the shape of the ground plan to be, rectangular, circular, or oval? What walks are necessary? What circulation must be provided for? What proportion of length and width is best? The fundamental thing will be, first, the division of the space into areas and sec-

ond, the arrangement of the things within these areas so as to give the right emphasis.

The great majority of gardens lack interest, individuality, and style. The style of the final result of our garden will depend upon two things, first; the successful solution of the practical requirements of the problem and second, the bringing out in the arrangement, the features that are to give it character or individuality. In doing this the designer will select from the variety of materials with which he is working, the ones best adapted to his conception of the final result, with the deliberate intent to produce a certain impression. The final success or failure of the garden will depend upon whether we have emphasized the right features. It is concerned more with the details or the carrying out of the plan, the presenting of the idea. There is no garden problem so commonplace, none so prosaic, that the final garden cannot be made more livable or interesting when the designer really studies the problem. The best examples of gardens are those of Europe which were designed in the 16th century, by architects and planted by landscape gardeners. These gardens do not depend for their success on the reputation of the men who designed them, but the gardens because of their lasting qualities have kept the name of their builder alive; these are their monuments. This fact, that the gardens have been so successful is that the *fundamental* things necessary in any design have been the principles upon which they were worked out. The questions of size, shape, proportion, unity, architectural or horticultural emphasis, privacy and the existing topography, were carefully considered. These gardens were designed to fit their function or use, making the house and garden one composition. Thus a "garden" in a real sense of the word, is a part of the house plan. To many people the mention of garden design brings to mind such gardens as those of Villa d'Este or the Weld Garden at Brookline, Massachusetts. The small garden often gives more real enjoyment to the client than the larger or more expensive one. When we go into a garden we want to feel at home. The requirements of the small garden may be said to be snugness and seclusion;



THE TYPICAL AMERICAN STREET, WITH OPEN LAWNS
AND TREE SHADED WALKS GIVE ONE A CERTAIN SENSE OF FREEDOM

of the larger one, simplicity and elegance. The problem of designing a small garden that is to be used as an out-of-door room is more difficult than the designing of a big show garden. In the small one, the materials used must first of all have more interest in themselves. Every detail must be worked out to have a special interest in itself and at the same time be a part of the whole composition. The practical considerations, as in all design, come first. The features used must be in scale with the size of the garden and at the same time be large enough to be of practical use. The walks should be wide enough for two people to walk side by side, or at least three and one-half feet. Planting areas should be at least four feet, and eight feet if used for screening. The flower beds should be wide enough to enable us to use enough flowers to secure a succession of bloom. Seats should be at least fifteen inches wide, four feet long and fourteen inches from the ground. There should be the correct proportions between the riser and tread in the steps. The plants used must not only give the effect desired, but must grow. These and many other details are the requirements that are to determine the practical value of our design. The selection of plants for form and color, and the situation of all features so as to secure harmony in the final result is an esthetic requirement.

The question of formal and informal design is constantly being brought forward by the casual enthusiast to be answered.

While often times the success of a plan will depend upon the bringing of existing natural features such as trees into the formal area about the house, where the architectural features predominate it does not follow that we should thrust our house plan down into the most wild and forest-like conditions. If the naturalistic conditions are such as to control absolutely the whole composition, and the arrangement of our garden is to secure the best enjoyment of these informal or naturalistic features let us work along informal lines, but if our problem concerns itself with a garden that is to be an extension of the house plan, and the purpose is to secure the greatest amount of use of the space, we should not try to pro-

duce something that is artificial from the start. In the planning of camps and forest lodges we often try to keep the surroundings exactly as existing because of the reason for locating the building thus. The surroundings in this case are entirely informal and natural and not something that we have planned. On the other hand, the bringing in of woodland conditions into our dooryards and trying to produce something that is unnatural from the start is not design. In the case of the camps or lodges we are using architecture as an accessory to the life in the woods, in the house amid the city conditions the house or architecture, should be the controlling element. The first is landscape, the second architecture, and the two are not "landscape architecture." *The building of a garden as a thing in itself is a different problem.* Here we can have some special features that will be characteristic and we may have a naturalistic or wild garden that will not pretend to be a part of the house plan, but a separate unit. On a large estate it is often desirable to provide a garden of this type, but we do not try to have it a part of the whole scheme. Thus we see that the location of our garden is the important thing in determining the whole scheme. The house plan itself is formal, in that the lines are straight or regular curves, and one of the purposes of the garden is to connect the house with the grounds. This formal area about the house is to act as the frame of our picture. This should first of all, then, be in keeping with the architectural character of the building. It is generally admitted that we must do something here to tie the building to the grounds and by keeping the architectural character of the plan we are sure to bring unity of style into our design. We do not want our garden to merge gradually into the country beyond but to form a transition from pure architectural design to the naturalistic surroundings. This area should first of all show that study has been given to the securing of the best use of the available space, with the greatest degree of privacy, by being screened from the outer world. We should not try here to imitate the unnatural effect of wild nature but should frankly show that we are in the house plan itself. We do not

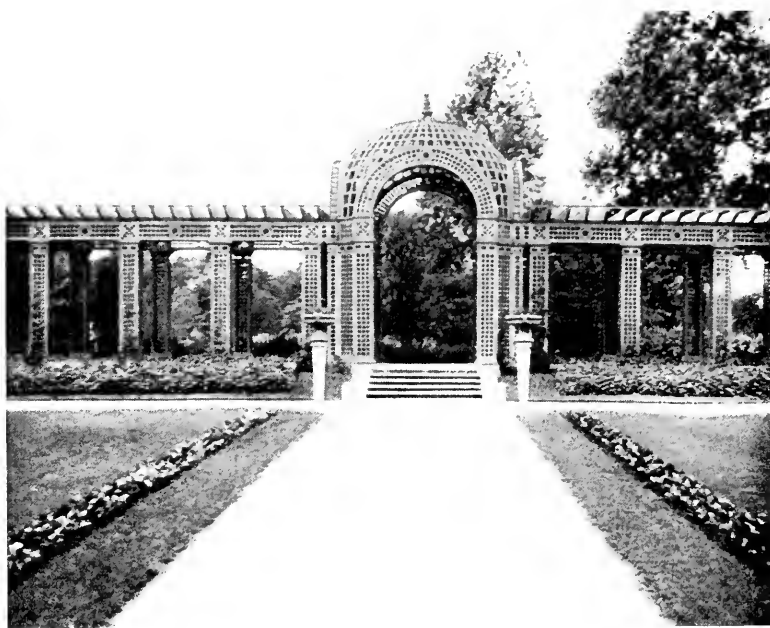


THE FIRST REQUISITE IS PRIVACY, THE
SECOND IS UTILITY

want our guests to believe that they are walking in the forest, but that they are in a part of the grounds designed to be used as the house itself. The tendency to neglect design and allow the representation of some particular style or feature to become the end rather than the means, is a common fault of garden makers. By becoming too interested in the arrangement of the garden features and accessories or trying to produce a natural effect, the artist loses sight of the fundamental idea. A garden depending upon a single feature because it is expensive or has beautiful flowers, fruits for the birds, or a pleasing sky line will soon become tiresome because of the monotony of having the same idea ever before our minds. A popular song comes out and it seems to us for a while to be the "best ever" produced, but after hearing it repeated many times we become tired of it and are glad to hear some composition that while not "catchy" has the fundamental harmonies as a basis of its design and arrangement. Composition means then the structural basis of its design is worked out and is entirely independent of the materials used. A statement that composition is the placing together of parts to produce a whole does not mean much to us unless we understand the materials with which we are working and can picture to ourselves the final result. We must not only be able to arrange but must be able to select. We must select the materials best suited to secure the desired effect and then arrange them in such a way as to produce by the actual direction of the lines, and the location of the masses or spaces, in our garden, a pleasurable impression upon the esthetic sense of our beholders. This effect of the final result then is the use of our materials in a practical way to secure an esthetic result. We are working then to secure beauty first of all, in our design but not at the expense of the practical.

The planting of a garden to be successful must harmonize with the building and its location, so that the right windows look out upon it, not those of the kitchen or servants' rooms. The general ground plan then, should be the result of coöperation. The best location of the house as regards the working out of a successful landscape scheme is some day to determine whether

or not that particular estate is to be one of *the* places on that street. The drying yard while usually left entirely out of our scheme is often the important thing, if our client is to be a satisfied one. The front porch used as a laundry yard does not add refinement to the architecture, nor to the enjoyment of the landscape. The garden area must be on the side where the greatest degree of privacy can be secured, and the plants se-



WHERE ATTENTION HAS BEEN GIVEN TO A PLEASING
ARRANGEMENT OF LINE

lected that will grow to best advantage. The garden located next to our neighbor's service yard, with its main axis on the kitchen window will not be a place of seclusion nor a pleasant out-of-door room in which to entertain our guests. In many of our architects' offices, the elevation is placed first, the plan second, and the entourage left out entirely. At its best, this is only used to decorate the drawing. The result, a "snappy sketch" that looks well on paper but does not work out well

on the grounds. The plants are crowded and usually do not live because of bad selection, the walks do not drain, and are not of the correct width and as a result the whole scheme is unsuccessful. The garden is neither ornamental nor useful and is a constant reminder to the client of a waste of both time and money. Coöperation does not mean that the house is going to be a credit to the landscape man, nor that the garden will be a credit to the architect, but the whole will be a satisfaction to the owner and to both architect and landscape man as well.

A more careful study of the houses and gardens in which we live, by the architect, and landscape man, would ultimately result in the working out of a real solution of this most important problem. To make of our dwellings real homes should be the ambition of the trained man in these fields. When once we get out of the rut in which we are now running and by a better understanding of the problem, have a new start, we can feel that something worth while has been accomplished. The average dwelling of today is not a home, but a house and lot. Each room is a separate thing with a special name, with the surroundings a most haphazard conglomeration of specimen plants and ill-constructed walks. Comforts are lacking and even utility is lost sight of. How many of us feel well satisfied if we can even have a comfortable chair in which to sit when in our rooms! The object of the study of house and garden design, then, should be first of all, to secure such an arrangement of the plan as to express the use of the building and its surroundings. One useful thing instead of many useless ones. The first use of the work garden was to mean an enclosed space which was one of three types; the court garden, the garden type, and the villa type. The present day garden may be defined as such an arrangement of the ground immediately surrounding the house as to secure the best comforts for entertaining guests and enjoying out-of-doors life.

The *court garden* was really a part of the house, an open space in the center of the building. The use of the enclosed space for gardening came after the space was provided. The garden was not thought of first, then the house built around it.

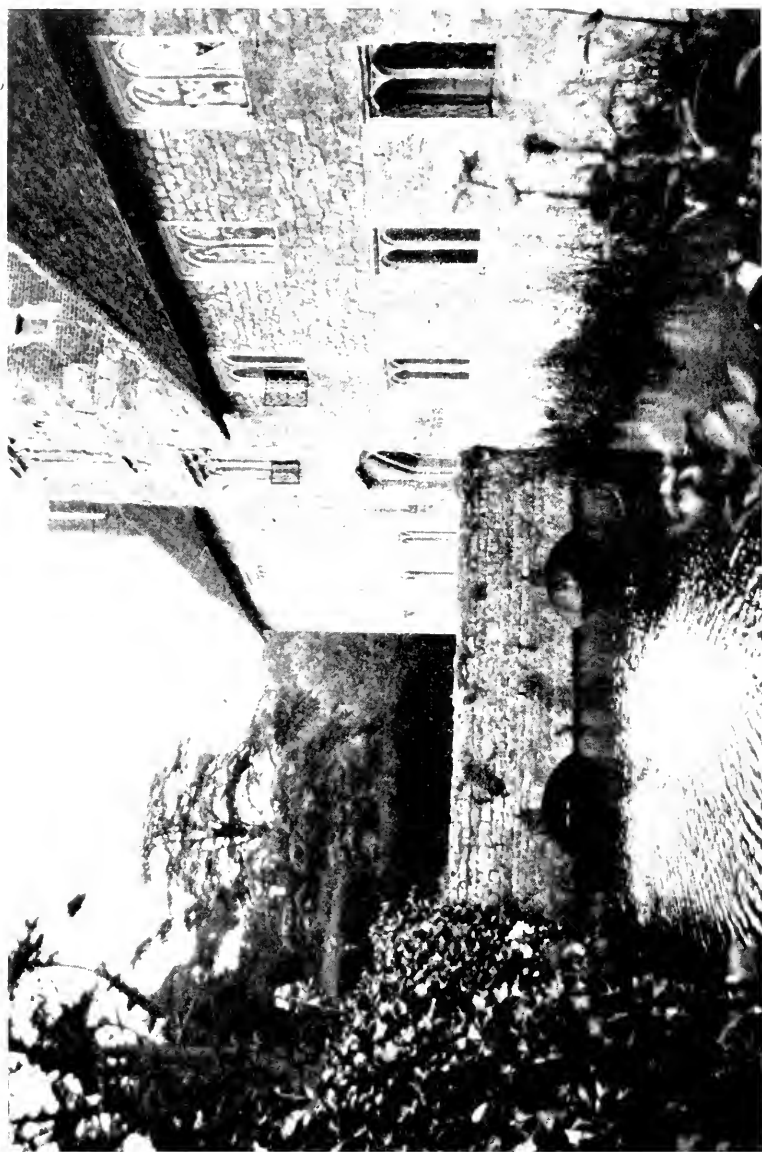


THE BUILDING OF A GARDEN AS A THING IN
ITSELF IS A DIFFERENT PROBLEM

The primary object of this garden was to furnish light and air for the rooms of the house and aid in circulation. In the Pompeian house the only windows were those about this open court. In the working out of the design for this type the emphasis will be architectural, we cannot get away from formality and we do not want to. Court gardens are used now to quite an extent for much the same reason as the early builders used them. This small space besides being used for circulation between different parts of the house served as a garden area. The well or fountain head would be located in the center and the surrounding walls used for vines and espaliered fruit trees. This type of garden is often found in modern buildings used for much the same purpose as in the early ones. A house recently built on the Atlantic coast has been most successfully designed with a court garden as a central feature. The wildest type of natural conditions come up to the outside walls of the house and in the center, sheltered from the winds and entirely in keeping with the architectural lines of the house, lies the court garden.

The *garden type* was really the result of the court garden not being able to satisfy the needs of the family for garden space. A piece of ground some distance from the house is enclosed by a wall, and a garden arranged in the space. Examples of this type of garden were common in England during the time when castles were built as strongholds with little room for gardening. This garden was planned as a place to enjoy peace and to cultivate plants for which there was no room inside the castle walls, or moat. In this type of garden the emphasis may be either architectural or horticultural as the problem required. These gardens are usually designed to fit a peculiar need. The "Weld Garden" at Brookline, Massachusetts, designed by Charles Platt is a good example of this type of garden. No attempt was made to make it a part of the house plan, but a unit in itself. The public gardens or parks of today fill the same need. A place to go and enjoy the things that one finds in nature.

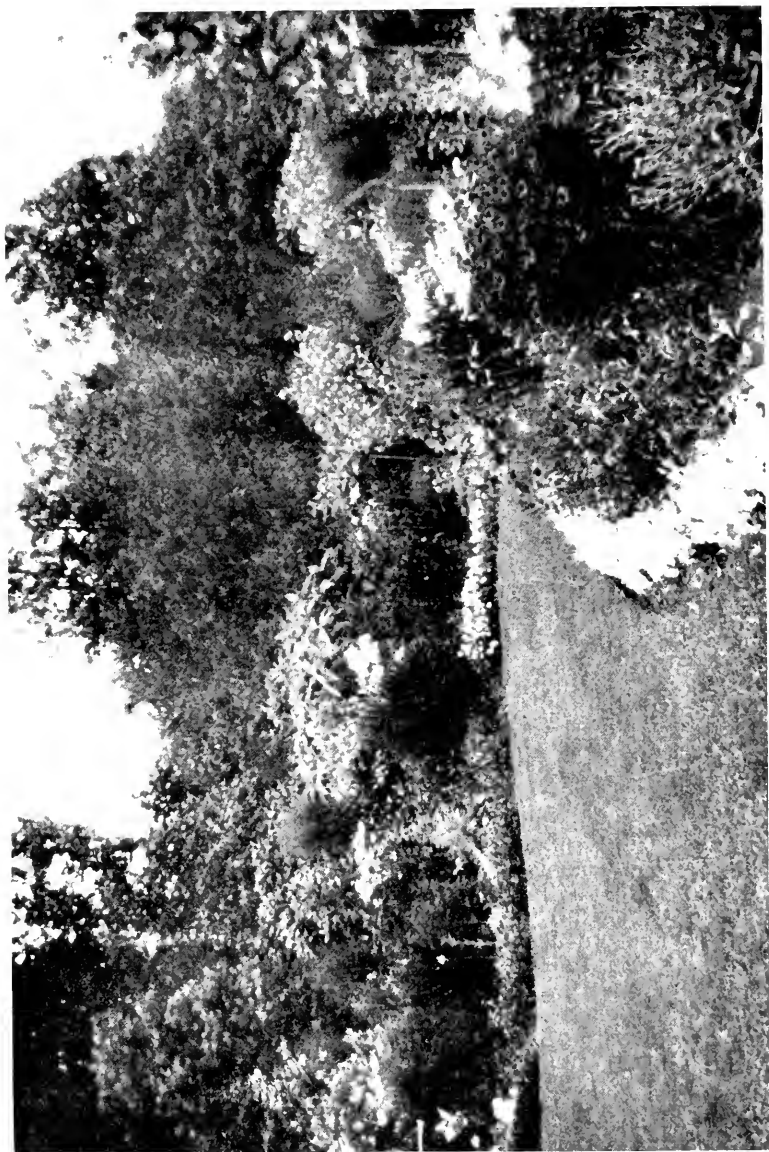
Villa Type. This type developed from the garden type. At



PLANNED AS A PLACE TO ENJOY PEACE AND TO GROW PLANTS
FOR WHICH THERE WAS NO ROOM INSIDE THE CASTLE WALLS
OR MOAT

first a summer house was built in the garden, located outside of the castle walls. This began to assume more and more the proportions of a house until the new type was developed and we have the villa type with the house and garden one composition. Because of the natural development in the early history of this type, the best examples are the ones first built, and because of the conditions under which they were designed, formal in treatment. The English country estate with its terrace and formal gardens near the house forming a transition with the park and open lawn, is the best example of this type of development. The country estate of today may be said to be a combination of the three types of gardens: court, villa, and garden. The gardens of Italy are ever in our minds as ideal gardens of this type. There are two reasons for their constant praise in books and magazines. The first is that the enthusiast sees only the esthetic side, the charm of the gardens, while the real student sees first, perfection of their design both in their plans and the details and second, that these are real gardens meant to be lived in. The accessories are not mere ornaments, but real furniture. The home life may be carried on in these out-of-door rooms as in the houses themselves. The walls are a necessary part of the design as they secure first, a definite area, and second, the first essential of any garden, privacy. The working out of problems of this type takes us into real problems of landscape architecture, the design of country estates. To be successful there must be coöperation between the landscape architect, the engineer, the horticulturist, the sculptor, the gardener, who must work for years before anything like the final result will be achieved. The more informal the layout the more the gardener will have to do with it.

We may have gardens then, in relation to the house as a part of the house plan, or an extension of the house plan, a setting for the house, out-of-door rooms, a place to go for the enjoyment of some special features, or a garden in itself. We will consider then the garden as a setting for the house or an extension of the house plan, an out-of-door room. The requirements that must be met with in the designing of the gar-



THE PUBLIC GARDEN A PLACE TO GO AND
ENJOY THE THINGS THAT ONE FINDS IN NATURE

den for these purposes are first; that it must harmonize with the architectural lines of the house, a part of the house plan itself, and not a separate unit; second, our garden must fit the needs of the people who are to use it. Climatic conditions have much to do with what features will bring the most comfort to the owners, as to be successful every garden must first give pleasure. The garden of the far East was designed to be used as arbors or conservatories are in this country, rather than as places for exercise. From the standpoint of design these gardens were almost perfect, in bringing in the best possible way, the most desirable features within easy reach of the people who were to use the gardens. The object was to secure in the best possible way, relief from the discomforts that one would naturally find shut up in a building in that climate. The idea was to arrange a sort of outdoor room in which all the luxury of the house could be enjoyed without the discomforts of temperature. Trees were provided for shade from the sun and under them, seats were arranged upon which the people might sit inhaling the pleasant odors of the flowers, breathing the fresh air, cooled by the water in the pools, enjoying breezes and listening to the singing of the birds. This indolent recreation was more enjoyable than games of tennis or exercise by walking about. Whether we have tea lawns, arbors, flowering plants or bowling greens, croquet and tennis courts, swimming pools or garden theatres and special collections of plants will depend upon whether the owner desires to use the garden for rest, exercise or study. The third and most important point from the outsider's point of view is that the garden must be adapted to the landscape conditions surrounding it. An Italian garden in a New England climate will never be entirely satisfactory for a city home, if our client is to be away during the summer. The marble garden accessories are not of value if packed away during the season the family are at home, nor are the exotic plants of value if they must be covered with burlap from November to May. An evergreen garden with suitable architectural features that are hardy in the climate are of more value and will give more pleasure and satisfaction.

To the visitor a garden depends for its chief interest upon the first impression received, the importance of this cannot be over emphasized in the working out of the design. The first impression should be that we are glad that the garden has been built there, and that we are to enjoy it as a good picture. The first impression should not be that we are looking at something expensive, that the well-head came from Italy, or that the fountain is real marble. We should see the whole thing as one com-



GARDEN GATE THROUGH WALLS USED TO SECURE
PRIVACY

position. If there is an unusual view it should be a part of the garden—a fine painting in an out-of-door room. The seats should invite one to rest and the flowers add life and color. In a garden conceived in the organic sense, the ornamentation is a part of the ground plan and is the very frame work of the design. Any ornamentation that is added later is only a confession on the part of the designer of his lack of originality and understanding of the first principles of his art. Making the necessary features, the ornaments, as dominant features, is the

real secret of success in design and the real solution of the problem. One of the first rules given by Repton is that a garden should never be located between the observer and the view. A glaring formal garden full of special features and objects that in themselves fight for attention would not be a good foreground, but an informal planting with the plants arranged in such a way as to emphasize the view and still have interest in themselves, would be of great value to any scheme.

In the design of a house the first essential of good planning is to have it in perfect harmony with its surroundings. We should plan for, first of all the connection of the various rooms of the house with the grounds. The entrance for the family should be a part of the entrance walk, the service should connect with the service portion of the house, and the more private rooms should be connected in a most intimate way with the private portion, such as terraces and lawns. This part of the grounds should be a place for the social life of the family and their guests. The first requisite is privacy, the second is utility. The garden is first of all the out-of-door reception room, and the other parts of the estate correspond to the other rooms of the house. In a garden then, we want facilities for the entertaining in a social way—here we place our decorative features, fountains, statues, seats, loggia, etc. In the Italian gardens, we have an example of an entire garden designed for one purpose, that of entertainment. In the ideal English estate we have the garden located near the house for this purpose, and then the whole estate divided into definite areas for recreation and the enjoyment of out-door life. In the planning of the garden near the house the first requirement is to have it a part of the house plan. The whole garden composition is the room. The plants and architectural features are the furnishings and the walks are the open spaces, the floors and rugs. The object of these is to make it possible to enjoy the special features and not as features in themselves. We are to use the distant views like fine paintings. If these do not exist, we must provide interest in the garden itself. The location of these features should be determined by existing conditions. Where pleasing



THE MORE INFORMAL THE LAYOUT—THE MORE THE GARDENER WILL HAVE TO DO WITH IT

views are impossible and space is limited, we often design the garden so as to use some terminal motif. If the garden is to open on to a lawn, then the interest is often concentrated on some feature in the center of the lawn. A space about the house in which some attention has been given to a pleasing arrangement of line and form, will always give more satisfaction than a haphazard arrangement of winding paths and specimen plants. There is sure to come a time in America when the word formal as meaning clipped trees, and carpet bedding, and the word informal as meaning wild wood and native conditions, will be dropped, and in place of formal gardening and informal gardening, we shall have the one word landscape gardening or landscape architecture, if you choose. This was brought about in England in 1800 by Humphrey Repton, and we should not be more than one hundred and eighteen years late. A part of every house problem should be to make of the garden part of the home grounds, real out-of-door rooms, in which the comforts of the indoors may be enjoyed without the discomforts of the average outdoor public lawn. This problem really solved so as to fit the individual needs of the dwellers making it actually an extension of the house plan, pleasing in color and proportion with utility and permanence, fundamental in design, is the real opportunity that the architect has to bring success to his work. A garden to be lived in should be designed to wear well (woodland conditions will not wear well), which means that they must have first of all simplicity in their arrangements and no attempts should be made to secure a startling effect. Often times we find that accessories have been used that are entirely out of harmony such as a Pompeian table that is of no value except as a curiosity, a special plant that has no reason for being used except that it came from Japan, or was sent by a kind friend from Mexico. If we want purely decorative features let us use those that will first secure a place because of their utility and then attract attention because of their beauty.

Artificial Manures for Roses^{*}

By Richard W. Woosnam



PROBABLY the average Rose grower is less informed on the subject of manuring than on any other detail of successful culture. Too many are apt to shovel manures of which they know little on to soil of which they know less. The result may be anything. If the Roses are good the manure gets the credit, but if bad the blame is generally laid on the weather. It rarely occurs to the Rose grower that he may have applied the wrong manure at a wrong time to a soil totally unsuited to such treatment.

Everyone knows the novice who is under the impression that show blooms are produced by the application of some mysterious substance to the plants, the name of which is guarded with masonic secrecy. When he fails to discover the wonderful nostrum he frequently settles down to some proprietary mixture which claims to grow anything from a Rose to a radish—of course, at a price proportionate to the magnificence of the advertisement.

It is in the hope therefore of shedding some little light, for the beginner more especially, on the more common of what are known as artificial manures and on their application that the following notes are made.

In the first place, before putting on artificial manures the beds must be thoroughly well made and a good drainage secured. This is absolutely essential. A full $2\frac{1}{2}$ to 3 feet is the depth to which the soil should be dug, taking care to keep the lower spits in their proper place and not mixing them with the top soil. It is taken for granted also that a good stiff dressing

^{*} Reprinted by permission from the 1917 *National Rose Annual*, of England, from which we also take the next article.—ED.

of the best dung obtainable has been added when making the beds, putting it at about a foot below the surface. There are many reasons for making a bed in this way which need not be gone into here, but it is sufficient to say that the addition of artificial manures to soil that has not been properly cultivated is more likely to do harm than good. Further, it is important that there should be a sufficiency of lime present in the soil. This is a necessity, and it is more often in short supply than is suspected. So easily is lime acted on by the decomposing humus in the soil and carried down by the rain to the lower levels that it is not uncommon to have to add lime to land actually situated upon a chalk subsoil.

The manurial value of farmyard dung is low but, largely by reason of its mechanical effect, it is a sheet anchor to all Rose growers, and should always be employed when obtainable. In order to obtain the best results artificial manures should be regarded as supplementary, but when used on well-tilled beds they are most valuable. They are much more powerful than dung in their action, and care must be taken in using them.

The choice of artificial manures is influenced by the quality and variety of soil upon which they are to be used. For example, basic slag is preferred on heavy clays and spring dressings of superphosphates on light loams. The season of growth also has to be considered when giving artificial manures. For instance, if nitrate of soda is put on the beds too early in the year a quick, sappy growth is made which is very susceptible to late frosts, and is also easily attacked by the many diseases to which the Rose is prone.

Many of the substances which go to build up the growing plants are found already in sufficient supply in most soils, and apart from lime the only shortage likely to occur is in phosphates, nitrogen and potash. In order to produce a full crop the amount of each of these must not fall below a certain minimum. There may be an abundance of everything necessary for plant growth except in one essential constituent—it may be phosphoric acid, or nitrogen, or potash—but the shortage in this

one respect is sufficient to seriously prejudice the crop, whether it be Roses or anything else.

Where dung has been regularly applied sufficient potash will almost certainly be present. It is well to remember this just now, as practically all the potash salts have been hitherto imported from Germany, and in consequence they can only be bought at an almost prohibitive price. The ashes of the rubbish heap, which contain about 5 to 10 per cent of potash, may be used instead with much advantage. They should on no account be allowed to remain exposed to wet, as being easily soluble the most valuable portion is soon washed out.

Nitrogenous manures must be used with caution, but at certain times, as, for instance, about the middle of July after the main blooming is over, they are of considerable benefit when given in weak solution.

Phosphatic manures are of the greatest importance for Roses. They give vigour and promote freedom of bloom, and for both exhibition and garden varieties are essential.

The following are some of the most useful artificial manures. After applying them they should always be well hoed in, but care must be taken not to go too deep and thus injure the Rose roots. Choose showery weather, or give a good soaking of water to the beds both before and after application.

Phosphatic Manures

Superphosphate. A quick acting manure composed of mineral phosphate treated with sulphuric acid. The process renders a considerable part of the phosphate soluble in water, and its value depends almost entirely upon this. It should contain from 26 per cent to 36 per cent of soluble phosphate according to price. Apply in the spring about pruning time at the rate of 3 oz. per square yard.

Basic Slag. A slower acting fertilizer than the above. It is the finely ground slag from certain steel furnaces, and its value is determined by the fineness to which it is reduced. It should be guaranteed that 80 per cent will pass through a sieve of 9,600

meshes to the square inch. Basic slag consists partly of free lime, and no other liming need be employed where it is used. It is generally preferred on soils that are on the heavy side. Apply in the autumn at the rate of 4 oz. per square yard for top dressings. It may advantageously be added to the soil when planting, and as much as 1 lb. per square yard may be used.

Bone Dust. The powdered bones from glue works. Slow acting but excellent if liberally added to the soil when planting.

Nitrogenous Manures

Sulphate of Ammonia. A soluble fertilizer prepared from gas liquor and containing 20 per cent of nitrogen. This may be applied in the spring as a top dressing at the rate of 1 oz. per square yard, preferably about the time that the bloom buds are first visible.

Nitrate of Soda. A soluble salt dug from the large natural deposits in Chili and adjacent countries. It contains 15.5 per cent of nitrogen. The results from its use are immediate, but it is not retained by the soil quite so long as sulphate of ammonia. It is best given as a top dressing in the spring, using 1 oz. per square yard when the bloom buds have just appeared.

Potash Manures

Sulphate of Potash and Muriate of Potash. Both are soluble potash salts, and may be applied in the spring at the rate of $\frac{1}{2}$ oz. per square yard.

Wood Ashes contain about 5 per cent to 10 per cent of potash in the form of carbonate. They are very easily soluble in water and may be applied in the spring, using 3 or 4 oz. per square yard.

Peaty and chalky soils are the most often deficient in potash.

Various Other Manures

Guano. This varies greatly according to whether it comes from deposits in the dry rainless belt, or from places where it

is more or less wet. The best Peruvian Guano is a rich complete manure, whereas the common kinds are of value only for the insoluble phosphates they contain. When buying, a guaranteed analysis should be insisted upon.

Bone Meal is unsteamed bones ground to a meal. It is slow acting, but contains nitrogen as well as insoluble phosphates. Bones may also be bought crushed in various grades, such as $\frac{1}{2}$ inch and $\frac{1}{4}$ inch. In any size they are useful for mixing with the soil when planting, but in the larger sizes the return is very gradual and spread over some years.

Dissolved Bones. This is somewhat similar to superphosphate, except that instead of mineral phosphate bones have been used for treatment with sulphuric acid. It should be made with unsteamed bones, and then contains nitrogen as well as soluble phosphate.

Fish Guano is dried treated fish refuse ground to a meal. A good sample will contain about 8 per cent of nitrogen and 10 per cent of insoluble phosphates. It is a slow-acting manure, and is therefore best applied in the autumn.

Dried Blood contains about 10 per cent of nitrogen, and decomposes in the soil fairly quickly. It contains very little phosphate or potash, and must be used cautiously, as it tends to promote sappy growth.

Hoofs and Horns, Shoddy, &c. These are very slow acting indeed. They are rich in nitrogen, but their decomposition is altogether too gradual for most Rose growers. They may be used with advantage, however, when planting climbing Roses in more or less permanent positions. In these circumstances a phosphatic fertilizer should also be added, as, apart from their nitrogen, there is little manurial value in any of them.

The foregoing are the more ordinary artificial manures in use. There are in addition what are known as compound manures, some of which are described as "Special Rose" manure, and often bear a fancy name. Many of them are well balanced and of value, but there are others which are made up of material which is unsuitable and of little immediate use. When contemplating the purchase of a compound manure it is well

to remember that the fertilizers one would use as a spring top dressing are not the same as those to be selected for incorporating with the soil at planting time in the autumn. Also that the most suitable manure on one class of soil would very likely have to give place to others on a different staple. The price, too, of these "special" manures is nearly always far in excess of their unit value.

But little serious experimental work has been carried out in the matter of Rose manuring, though the general principles as applied to farm crops are adapted here also. Many important and highly interesting questions suggest themselves. As an example, "What is the effect of increasing quantities of magnesia on Roses?" It has recently been pretty well established that upon wheat lands the addition of magnesia is beneficial to the crop so long as it does not exceed the amount of lime present. Beyond that limit it has the reverse effect. There are soils in this country in which an excess of magnesia over lime occurs, and where the addition of the latter in sufficient quantity to redress this has had a very great effect. Does not this in all likelihood apply to Roses also?

Rose Perfumes

By Rev. Joseph H. Pemberton



HAT was it that made the Rose so popular in days gone by? Until one hundred years ago it was just a bush in the garden border, sharing it together with pinks and columbines, marigolds and lilies, London pride, love-in-a-mist, hollyhocks, sunflowers and Michaelmas daisies.

In the days of Queen Anne tulips were all the fashion with specialists, but fashion is always fleeting, and that which is the rage to-day will pass away to-morrow. Other flowers have had their day, but the Rose has held its own in the face of all vagaries. And then just think of the sort of flower it was, only a century ago; a flower of June, not beyond; a flower, as compared with others, small in size, and for the most part poor in colour. What, then, was it, we ask, that made and kept the Rose a universal favourite in days gone by? Let Shakespeare reply. Whether he had a garden or not is immaterial; but this we know, that as he wandered along the country lanes it was the perfume of the flower, of the Rose, that caused him in his heart to sing:

I know a bank whereon the wild thyme blows,
Where oxlips and the nodding violets grows;
Quite over-canopied with luscious woodbine,
With sweet musk roses and with eglandine.

Yes; the delicious fragrance of the *R. arvensis*—the good old English musk—and the Sweet Briar won his heart, and he loved them because of their fragrance. And so it has ever been. Lest, however, we should attach more influence to fragrance than it deserves, we must not disguise the fact that the increased popularity of the modern Rose lies to a great extent

in its extended flowering season, brilliancy in colouring and diversity of habit. Nevertheless, it was perfume that made it the favourite flower in its early days.

And some folks have inherited the desire for fragrance from their forefathers; it has been bred in the bone. A few years ago, when the Rose was more or less regarded as an exhibition flower, fragrance was quite a secondary qualification of a good Rose; everything gave precedence to size and form. The exhibitor was content with his high-pointed beauties, wired up and stuck in serried rows in a regulation size box, and was in an agony when some friend, not being an expert exhibitor, but one impelled by heredity, popped his nose on to the point of the flower and sniffed. As his forbears had done so did he. Times, however, are changing; size and form are no longer dominant. We now seek for beauty in the colour and freshness of the Rose; we like to see a full-blown flower disclosing its golden stamens and anthers, and, together with all this, we seek for fragrance.

But the quest for fragrance is to some a novelty, and for this reason it may be narrow. The quest may be confined to that perfume which has been described as "the true old genuine Rose scent, such as may be found in the old cabbage, or Provence Rose, in Général Jacqueminot, Marie Baumann, Duke of Wellington, General McArthur, etc.;" if so, is not our idea of Rose perfume restricted and, from the terms used above, is it not implied that the Musk Rose perfume, for instance, is not old, is not genuine? No, let us guard against narrowness. We know there is more diversity in the Rose family than in any other flower, and no one is more alive to this diversity than the amateur who cultivates his own Roses, especially when he wants to prune them. Diversity in habit, diversity in the mode of producing flowering shoots, diversity in flower development, and—let us emphasise this—diversity in perfume; and it is here wherein our discernment may perhaps be defective.

All wild Roses have perfume; distinct yet refined in some, powerful and decided in others, and almost as variable as the Rose is in colour and form. *R. canina* has its own perfume, so

has *R. arvensis*; and both grow side by side in the same hedge-rows. Now, how many amateurs, blindfolded, can detect the difference between these two Roses from their respective perfumes? The eye of the Rosarian has been educated; it is alert. The Rosarian appreciates form and colour, he values the arrangement and length of stamens, the quality and brilliancy of the pollen; few, perhaps, of the general public can see what he sees. But has the training of his sense of smell, where Roses are concerned, been equally developed? That is a question. A chairman of a floral committee once observed to the writer that a certain Rose which had just received an award had no smell, whereas the musk perfume was strong, and the bees, where it grew, forsaking all other Roses in its proximity, thronged the blossoms of this Rose. But he did not profess to be a Rosarian.

We have said that all wild Roses possess fragrance—some, of course, more than others; but for the purpose which lies before us, let us confine our attention to those wild Roses from which are derived the majority of our present day perpetual-flowering varieties, namely, *R. moschata*, or the Musk, *R. centifolia*, or the Damask, *R. indica odorata*, or the Tea-scented and *R. lutea*, or the Persian Rose. In these wild Roses the perfume is pure, and for that reason we can easily detect the difference between the Musk, Damask, Tea, and Persian; but when we come to deal with the perfume of our garden Roses it is not so easy. Our garden Roses, it will be remembered, are the result of crossing one variety with another. It may be that the original parents had each a different perfume, and inasmuch as we expect and generally discern the characteristics of the parents produced in their progeny, so we find a blend of perfumes. The blended characteristics which appear to the eye are soon perceived, but the blended perfumes are frequently undetected. But before going further into the subject of blends, let us first consider in detail the four chief perfumes.

1. *The Musk.* Here we have a delicate and refined perfume, suggestive of heather and lime blossom. It is, moreover, diffusive. Go into the garden on a quiet day in summer; the perfume of the Musk-scented Rose pervades the atmosphere as

does the lime. It is beloved of bees, and attracts them more than any other Rose perfume. Roses with musk fragrance are generally produced in clusters, and the prevailing tone is white, or light-coloured. Seeing that some of our English wild Roses, *R. arvensis* for instance, are impregnated with musk, we may rightly term the musk perfume "the true old genuine" British Rose scent.

2. *The Damask.* *R. centifolia*, the Rose of Damascus, brought to France in the time of the crusaders, gives us the damask perfume. This fragrance is heavy, strong and positive, but not, in the writer's experience, diffusive. That is to say, this perfume does not seem to impregnate the air as does the musk; you have to take the Rose and smell it. But being so strong and positive in the individual flower, it has come to be regarded by many as the real Rose scent, and a Rose which has it not, although it may have another perfume, is apt to be deemed scentless or deficient in scent. It is from this perfume that attar of rose is manufactured—prior to the war this was a great Bulgarian industry. The usual colour of a Rose with damask perfume is red, and the flowers are generally borne one or two only on each stem. We seldom if ever find a cluster Rose having pure damask perfume.

3. *The Tea-scented.* For this perfume we are indebted to *R. indica odorata*. Here, again, the perfume is not diffusive—it has to be sought for in the flower itself; nor is it as definite or dominant as the damask. The pure Tea perfume is found in the older varieties of the Tea-scented Rose, especially where the colour is buff or pale flesh.

4. *The Persian, or Fruit-scented.* Roses for the garden with perpetual-flowering habit, derived from *R. lutea*, a Persian Rose, are of comparatively recent introduction, and therefore their special perfume has not as yet received a popular name. May we venture to call it "Fruit-scented?" Roses of this class have all, more or less, a subtle fruity smell, one suggestive of apricot, another of pineapple. It is not at any time, however, a strong perfume, and if our sense of smell is not alert, we might conclude that Roses possessing this perfume were scentless. This

fragrance is never so positive nor dominant as that of the Musk or Damask, but in most Roses of this class it is there all the same.

Now let us attempt to classify these four perfumes described above—it is only an attempt—and at the same time indicate a few of the best examples in each class.

CLASSIFICATION OF PURE PERFUMES

<i>Perfume.</i>	<i>Species or Variety, and Habit.</i>
I. Musk.	R. moschata nivea (M); not perpetual. R. brunonis (M); not perpetual. The Garland (M); not perpetual. Seagull (M); not perpetual.
II. Damask.	York and Lancaster (the true) (D); not perpetual. Tuscany (D); not perpetual. Marie Baumann (H.P.); perpetual. Général Jacqueminot (H.P.); perpetual. Sénateur Vaisse (H.P.); perpetual. Souvenir de Pierre Dupuy (H.D.); not perpetual. Zéphirine Drouhin (B); perpetual.
III. Tea-scented.	Gloire de Dijon (T); perpetual. Madame Bravy (T); perpetual.
IV. Fruit-scented.	R. lutea; not perpetual. R. lutea bicolor; not perpetual. Rayon d'Or (P); perpetual. Louise Catherine Breslau (P); perpetual.

And there are blended perfumes which, like blends of tea or tobacco are superior to the pure perfume. The blend of musk and tea is one—to the writer the most enchanting of all the Rose perfumes—the blend of musk and damask is another. It seems, however, that the two distinct perfumes of damask and

tea will not blend. We know how strong these perfumes are apart from each other, and it may be by reason of this dominance that when they meet the perfume of one holds up the other. At any rate, when raisers, in their efforts to obtain more free-flowering Roses, crossed the hybrid perpetual with the tea, their progeny had no perfume. Free-flowering and good autumnal Roses certainly were obtained, but, for the most part, at a loss of fragrance.

CLASSIFICATION OF BLENDED PERFUMES

<i>Perfume.</i>	<i>Variety and Habit.</i>
I. Blend of Musk and Tea.	Lamarque (N); not perpetual. Maréchal Niel (N); perpetual.
II. Blend of Musk and Damask.	La France (HT); perpetual. Mrs. A. E. Coxhead (HT); perpetual. Edward Mawley (HT); perpetual. General McArthur (HT); perpetual.
III. Blend of Damask and Fruit-scented.	Juliet (P); perpetual.

And here is another point bearing upon fragrance, which an examination of the above tables of Rose perfumes will go far to prove, and that is that perfume is more or less an indication of the flowering habit of those varieties which are perpetual. In those Roses set forth in the list as good examples of pure damask perfume, are any of them free flowering and good in autumn? On the other hand, do you want Roses with a long season of flowering, the first to come and the last to go—one refers to perpetuals—is it not just those with a musk or fruit-scented perfume, either pure or blended, that we should select? Rayon d'Or, fruit-scented, flowers from early June to late September, whilst General McArthur and Mrs. A. E. Coxhead, whose per-

fume is a blend of Musk and damask, are some of the very best of October Roses. Now with this fact before us, when we are appraising the value of a new Rose, we take particular notice of perfume, however faint it may be. If we discover from its perfume that the Rose has a strain of musk or fruit scent, we have ground for believing that it will be free flowering, and good in autumn. And on the other hand, if the new Rose has pure damask fragrance only—delicious though it may be—we may rightly conclude that it will not have a long season of flowering. Of course, there are other signs besides fragrance that indicate the musk or any other strain in a Rose, but these are not now before us; we are dealing with fragrance.

In offering these brief notes for consideration the writer begs the reader to accept them simply as the writer's own private opinion based upon personal observation; he would be the last to be positive on any matter connected with the Rose. They may, however, be helpful to others to discern—if they have not already done so—in this, the most lovable of all the flowers in the world, that beyond diversity in habit of which we are all aware, there is perhaps even more diversity in Rose Perfume.

Forcing Native Plants

By H. Ernest Downer



OUTSIDE of botanical gardens the use of some of our native plants for early flowering under glass seems to be practically unknown, yet we have amongst them several kinds adaptable for this purpose, and fully as pleasing as some of the well known exotics which have their established place in our greenhouses. While it must be said that nowhere else are they so charming as when blooming in nature's own garden, at the same time there is a good deal of real pleasure to be derived from adding to the length of their flowering season in this manner. There is a fascination about their fresh beauty which appeals to all lovers of plants, and they should be especially beloved by the many people who are the happy possessors of a small greenhouse. For, with these plants the term "forcing" does not mean high temperature and a steamy atmosphere, neither does success imply any great difficulty or expense.

To start at the beginning, it is only by the use of the very best plants that it is possible to secure, can success be attained. Second-rate plants can only bring disappointment and a disinclination to try again. Equally important is it to see that the plants are put into pots, pans, or flats as early as possible after top growth has finished, so that their roots may become somewhat established before winter.

If possible to do so, it will well repay if the plants to be forced can be given special care beforehand. Allow a season of growth in good well prepared soil, keeping all flower buds picked off so that all the energy may go toward building up a strong plant. However, perfectly satisfactory stock for forcing can be purchased direct from certain firms who make a specialty of native

plants, but it is well when ordering to state the purpose for which the plants are required. Plants with much foliage at the time of potting can have this shortened somewhat with no apparent bad consequences, and they are helped to a quicker recovery from the shock of lifting if kept in a close frame for three or four days, but afterwards give full exposure to the weather for as long as conditions will permit. Those kinds whose foliage has completely died off may be placed in some out of the way corner after potting, covered with a few inches of leaf-mold or moss and forgotten until steady freezing has come to stay. Their soil requirements are met by a mixture of equal parts loam, leaf-mold or spent hot-bed manure, and sand, potting moderately firm.

When winter sets in early it will be necessary to remove them to some convenient place of storage until the time arrives to bring them into the greenhouse, which may be from the first week of January on. A deep frame or pit will answer the purpose, standing the pots on boards or sand so they may be taken out more easily if frozen.

Give a generous covering of dry leaves, and provide ventilation whenever possible. Should mice take up their winter quarters in the leaves measures must be taken to be rid of them. A bulb cellar has proved an ideal storage place, where the temperature was maintained fairly constant about 35° F. and where sufficient light could be given to those kinds which need it.

A greenhouse with a night temperature of about 45° F. is quite suitable for their development. Brought in early in January certain kinds will flower in about three weeks, and from then on till March a succession of these dainty flowers can be maintained.

The following list is not exhaustive, but all the kinds mentioned I have found to be reliable. While naming them in their approximate order of flowering it does not necessarily mean in all cases the earliest possible date by which flowers could be obtained.

HEPATICA TRILOBA. Opens early in January and good for



PINK LADY'S SLIPPER CAN BE
FLOWERED FOR EASTER

(Courtesy of S. Stetson, Esq.)

several weeks. Looks well in four-inch pots or three plants in six-inch pan. May be forced year after year.

CLAYTONIA VIRGINICA. The dainty little Spring Beauty quickly follows *Hepatica*. For good effect plant the small tubers rather thickly in six-inch pans. Properly ripened off these can also be forced year after year.

CALTHA PALUSTRIS or Marsh Marigold. Does well in six-inch pots. Flowers in February.

SHORTIA GALACIFOLIA. This beautiful little plant must be well established. Put into six-inch pans in the spring, using peat in the compost in place of loam or else add to the leaf-mold. The flowers are pure white, about an inch across. The same plants can be forced for successive years.

DICENTRA EXIMIA. Related to the well known Bleeding Heart but smaller in every way. Free flowering and pretty.

STYLOPHORUM DIPHYLLUM, the Celandine Poppy, makes a good sized plant and needs a seven or eight inch pot. Has attractive yellow flowers.

SILENE PENNSYLVANICA. Good in small pans. Has pale pink flowers.

TRILLIUM GRANDIFLORUM. This is the best of the Wake Robins, and a well furnished eight or ten inch pan is very handsome.

HELONIAS BULLATA or Swamp Pink. A very desirable plant, sending up a stout stem bearing numerous pink flowers arranged in a dense spike.

MERTENSIA VIRGINICA or Virginian Cowslip. Must be very well established, best potted in the spring and plunged outdoors for the summer. Flowers purple-blue arranged in gracefully drooping clusters,

PHLOX DIVARICATA, pale lilac, and P. SUBULATA, pink, are both good. Cuttings rooted in flats in early summer and not transplanted make an effective showing, but naturally year old plants are better.

AQUILEGIA CANADENSIS. Plants of the Wild Columbine may be raised by sowing seed early in spring. Transplant to the open ground or grow along in pots plunged for the summer.

ARISEMA TRIPHYLLUM. Jack-in-the-pulpit is always interesting, if not beautiful, with its green and purple spathe, arching over the spadix.

DODECATHEON MEADIA or Shooting Star is always pleasing and does well in six-inch pots.

CYPRIPEDIUM or Lady's Slipper Orchid. Three species of this handsome genus succeed very well. *C. acaule*, pink, *C. pubescens*, yellow, and *C. spectabile*, white with purple markings. The first two flower about the middle of March, while *C. spectabile* requires about two weeks longer.

Except where noted, good results are not to be expected from forcing the same plants two years in succession, but if planted out in good soil and cared for, most of the kinds can be made use of in this way again after an interval of two or three years.

Northampton,

Massachusetts.

The Vegetation of Korea*



HERE are waterfalls in plenty and the scenery is remarkably fine on the Diamond Mountains in Northwest Korea. The vegetation, though not particularly rich in variety, is, considering the steepness of the mountains, luxuriant. Coernifous and deciduous broad-leaved trees grow intermingled and the autumn coloring is wonderful. The wealth of color in autumn is supplied almost entirely by three kinds of trees—the orange, red and crimson by *Acer pseudosieboldianum*, bright yellow by *Betula Schmidtii*, yellow to leather-brown by *Quercus mongolica*. In general the trees on Diamond Mountain are of moderate size only, but of *Quercus mongolica* there are larger trees than I have seen elsewhere. A most interesting feature is the quantity of fine old trees of *Taxus cuspidata*. In one area this tree forms 15 per cent of the evergreen trees in the forest. These Yews are from 30 to 45 feet tall and from 6 to 10 feet in girth of trunk, and the crowns spread from 40 to 50 feet. The trees must be very old for the trunks of many are mere shells, but their vitality is remarkable. Nowhere in my travels have I seen this Yew in such plenty as on the Diamond Mountains. The Korean Pine (*P. koraiensis*) and *P. densiflora* are everywhere common trees and both abound high up on the mountains, in fact to the summits of all but the highest peaks where *Pinus pumila* is found and also *Juniperus chinensis Sargentii*. The Korean Fir (*Abies holophylla*) is abundant up to 3500 feet alt. and in my opinion is as ornamental as the Japanese *A. homolepis*. Above 3500 feet *Abies nephrolepis* is common and so, too, is *Picea jezoensis*. No Larch nor *Picea Kozamai* grow

* Extracts from two recent letters from E. H. Wilson to the director of the Arnold Arboretum and printed here through the courtesy of Professor Sargent.—Ed.

on Diamond Mountain but all the other conifers of northern Korea are there except *Juniperus communis montana*.

"The special object of my visit was to collect seeds of the new *Thuja*, of a new *Forsythia* (*F. ovata* Nakai) and of a new genus allied to *Spiraea* (*Pentastina spiraeoides* Nakai). Of the first two I succeeded in finding seeds but I had to be content with bringing away living plants of the *Pentastina*. . . . The *Thuja* will be perfectly hardy in the Arboretum and I regard it as a valuable addition. In moist shady forests it grows into a small and shapely tree with branches sloping downward and outward and upturned toward the ends. More commonly, however, it forms a dense undergrowth, and on the high mountains either alone or under *Pinus pumila* covers large areas. I collected the seeds on *Miroku-Ho*, a peak 4335 feet high, on October 12, and we had scarcely finished when we were overtaken by a storm of sleet and ice. Besides the three plants mentioned above I got seeds of about forty others—some of them good things. *Acer pseudosieboldianum* is a large bush or small tree and its autumn tints equal or even surpass those of the Japanese *Acer palmatum*. But perhaps the best capture was *Acer triflorum*. This Negundo makes a large tree and has loose, papery, reddish gray bark and wonderful autumn tints of yellow and orange-red."

"I am back from the trip through south Korea where I visited the island of Quelpaert and the mountains of Chirisan. . . . The Chirisan range, which is situated in the south of the peninsula, is a well marked geographical boundary and here a majority of typical Korean plants have their southern limit: also it is the northern limit of many Japanese types which grow on Quelpaert and the islands of the Korean archipelago generally.

* * * * *

"Quelpaert Island is purely volcanic and the flora is essentially Japanese—in fact among woody plants extremely few Korean elements are present. In olden times the island must have been well forested with a broad coastal belt of evergreen



A KOREAN SHRUB
RHODODENDRON POUKHANENSE
ARNOLD ARBORETUM

trees and a central and upper belt of deciduous trees. But most of the forest has long since been cut down, yet in the ravines the variety of woody plants is astonishing. On the upper-middle slopes of Hallaisan are extensive pure woods of Hornbeam (*Carpinus lasiflora* and *C. Fauriei*) with a low undergrowth of *Daphniphyllum macropodum* and *Taxus cuspidata*. Such woods are unique in the Orient. Your Juniper is common on and near the summit, and *Rhododendron poukhanense* abounds from near sea-level to summit (altitude 6000 feet) *R. Schlippenbachii* does not grow on Quelpaert, its place being taken by *R. Weyrichii*. *Torreya nucifera*, *Pinus Thunbergii* and *P. densiflora* are indigenous on Quelpaert, and the first two are not found elsewhere in Korea. But the most interesting conifer on the island is a new species of *Abies* which is similar in habit to *A. Veitchii*, has cones like *A. sachalinensis* but less resinous, and bark like that of *A. nephrolepis*. I was lucky in being able to gather some seeds, and if this Fir will thrive under cultivation it should prove a valuable addition, for although only a small tree it is very ornamental. It is confined to Quelpaert and Chirisan, and is probably the only remaining Fir without a name in northeastern Asia. I think that this Fir and the *Thuja* are two of the best things we have found in Korea.

"On Quelpaert I was able to get seeds of *Rhus sylvestris* and *Vitis Thunbergii*, but I doubt if the former will prove hardy in the Arboretum. *Maackia Fauriei* is a small tree which in foliage and fruit is quite distinct from *M. amurensis*. It is endemic on Quelpaert and quite common. No *Spiraea*, *Deutzia* nor *Philadelphus* grows on Quelpaert, yet they are among the most common of shrubs on the mainland. On the other hand, *Hydrangea petiolaris*, *Schizophragma hydrangeoides* and *Ostrya japonica* are common on the island and unknown on the mainland. I could mention a number of other anomalies but these will serve to show the interesting character of the Quelpaert flora.

"On Chirisan I got seeds of a *Stewartia* which is probably only the ordinary Japanese species so common around Nikko, and of a *Rhododendron* which is supposed to be *R. Tschonoskii*. Both plants grow nowhere in Korea. On Chirisan such trees

as *Betula dahurica*, *B. Schmidtii*, *Alnus sibirica* and its variety *hispidula*, *Picea jezoensis* and *Pinus koraiensis* have their southern home."

E. H. WILSON.

Prairie Plants for the Garden

By H. S. Conard



SOME years ago a chance remark of a friend dropped into my consciousness with a weight that left a permanent impression. During a brief passage through Switzerland on a botanical mission, I was entertained by that prince of botanists and gentlemen, Dr. John Briquet, Secretary of the Société Internationale des Botanistes. In course of conversation the good doctor's countenance, always lively, lighted up afresh as he explained that the immediate vicinity of Geneva was still a very rich field for botanical exploration. Every year, he said, some new variety, or a species new to the region, or perhaps new to science, is brought in by local collectors from the neighboring hills. And this, in he land made sacred by the work of an almost continuous line of investigators since the days of Conrad Gesner—the seat of the Herbiers Boissier, Delessert and deCandolle! These thoughts were an inspiration on my return to Philadelphia. Since coming to Iowa, they have been a real beacon—though all too fruitless. We in America may well consider these matters. And our confrères in other lands may also do well to recognize that the time still is, when a barrel of surface soil from America might bring in treasures almost as rich as those which rewarded Dr. Fothergill. Every state has its college and experiment station, from which, and from hosts of non-scholastic citizens, seeds and plants can now be obtained, representing almost any nook or corner of our country. One line of exploration which still offers almost a virgin field, is the horticultural possibilities of the middle western and western floras. Some observations thereon are here offered.



SILPHIUM INTEGRIFOLIUM
THE RAYS ARE NARROW AND
LEMON YELLOW

The human value of a flora may be regarded in two aspects: the utilitarian, and the aesthetic. The first has been well outlined for our region in the lists of forest trees, forage grasses and food plants native to Iowa. The second has remained too much in the form of enthusiastic accounts by early travellers of the floral splendors of the open prairie. But it must now be recognized that the Iowa prairie is already almost totally destroyed. Probably not a foot of prairie sod exists which has not been at least mowed over for hay in summer. For the most part prairie sod is now reduced to the narrow strips along the oldest railways. Here it is annually mowed and burned in August or September, and the soil is clogged with coal dust and fragments of coke. The prairie flora, with few exceptions, never survives the plow. One cycle of cultivation exterminates practically every native species. We are speaking, therefore, of a rapidly disappearing flora, the successful rescue of which depends upon immediate action.

The prairie plants begin to bloom in June, growing more copious and more conspicuous as the season advances, until cut off by autumn drought or frost. The most showy and most plentiful flowers are the yellow summer and autumn blooming Compositae. Of some of these we have made observations throughout a series of years. No species has been followed exhaustively. Our notes are fragmentary. But we are convinced that certain of the prairie plants deserve, and would repay, critical and exhaustive culture, breeding and selection. Whether this work should be done on the native soil, and in the native climate of the plants is doubtful. It seems likely that a strange soil and climate is more likely to induce breaks of type. On this point, advice would be welcome.

Confining ourselves in this paper to a discussion of some of the native yellow Compositae of Iowa, we may speak first of the best known and least promising species, *Silphium perfoliatum*, the cup plant. This has long had a place in eastern gardens, where it grows from 4 to 7 feet high, and bears a considerable number of blossoms. When at its best, the flowers are showy. It is tall and coarse, and the ray-flowers are too narrow. It



COREOPSIS TRIPTERIS
WITH UNIQUE BROAD AND ROUNDED
RAYS

requires a rich, moist soil. So far it has not developed any variations. This is probably because it is so easily propagated by division that seedlings are rarely if ever grown. There is no visible reason why it should not be bred to shorter and more refined habit, and more showy, broader rayed flower-heads. Its robust growth and close tufted character make it a desirable species.

Silphium integrifolium, rosin weed, blooms before the cup plant, and continues longer in flower. It may be gathered here from mid July till September. In large roadside patches or even in individual plants it is very attractive. And I have once seen it effectively used in a garden near Philadelphia. It grows 3 to 5 feet tall, with strong but slender erect stems, and neat opposite, cordate sessile leaves. Old clumps send up numerous stalks, and it does not spread or run. The clumps are easily divided, and should be divided at intervals of a few years. On close examination, the flower is always disappointing. The rays are narrow and often unevenly developed. But the trim and sturdy habit of the plant, its strength and hardiness, warrant taking it into careful training. Shortening of stature and broadening of ray are its most immediate needs. It has not yet yielded variation under cultivation.

Two prairie species of *Coreopsis* deserve notice. Neither seems to be known in cultivation. After trial, we are convinced that both are worthy of more attention. *C. tripteris* is a tall (6 feet) erect, many-stalked herb, whose three parted leaves stand close to the stem, and clothe the plant nearly to the ground. The dark green foliage contrasts well with the bright yellow flowers. Each stalk bears a large open group of blossom heads, which last well both on the stalk and as cut flowers. The rays are broad and rounded, of a fine yellow tint, giving the head a distinct character, quite unique among all its kind. It has therefore the merits of strong stem, tufted but not spreading habit, easy propagation by division, columnar shape, fine color of foliage and flower, and individuality in the blossom. It is not a common plant in central Iowa, but is frequently met in moist places. *Coreopsis palmata* inhabits very dry prairie hill-



HELIOPSIS SCABRA
THE CUT FLOWERS OUTLAST
ANYTHING ELSE

sides, where it is a rather rambling plant, with scattering erect stalks 1 to 2 feet high. In rich garden soil it makes a very compact clump with great numbers of stalks, and a wealth of its bright lemon yellow blossoms. Clumps are easily divided and the rhizomes show but a limited tendency to run. The foliage is slender and insignificant. The individual heads are not long lived, so that when the plant is a little past mid-bloom, it is already becoming marred by the withered flowers. Also, the species requires full sun. It will not long survive in a crowded situation. However, while it was cared for in my garden it was one of the best things there.

Heliopsis scabra and *Helenium autumnale* are common wayside flowers in Iowa. And both are more or less known in American gardens. *Heliopsis* is, perhaps, our most cosmopolitan wild flower. It grows on dry banks, by roadsides, in the margin of moist pastures or in open groves. It blooms from the first of July till frost. The flowers are neat, evenly developed, fine in colour, and borne on long naked stalks. As cut flowers they outlast anything else of the kind. With a permanence that suggests a straw-flower, they have nothing of stiffness in appearance. In the wild the flowers average $2\frac{1}{2}$ inches across, with rays varying from golden yellow toward orange, the outside of the ray tinged green. In the garden, the plant becomes a dense clump 1 to 2 feet across, producing countless stalks and flowers. It does not migrate by root or seed; it does not overgrow and fall down. It is easily propagated by division. There is considerable variation in width and length of ray on different plants, as well as in color. Already 4 distinct varieties are known to gardeners, including a "double" form. It cannot be doubted that we have here a perennial of great promise, in no wise inferior to the more widely known *Heliopsis helianthoides* (*H. laevis*).

Helenium autumnale, a denizen of moist ground all over the northeastern United States needs no introduction. It has already shown an adaptability and variability that have won it a permanent place in the garden. In central Iowa the form described by Rydberg in the *North American Flora* (32: 127) as



HELIANTHUS TUBEROSUS
SUITABLE FOR MASS EFFECTS

H. latifolium Mill. is the common one. It is a splendid, bushy, rotund, free-flowering form. In the garden it is a great success, though it can be crowded out by taller plants. It is long lived and very easily propagated.

In *Helianthus* we find *H. scaberrimus* is impossible to confine. Though highly recommended in some garden literature, its slender running rhizomes preclude its entrance into ordinary gardens. Nevertheless, in large roadside beds it is probably the handsomest mass-plant on the prairie. Perhaps it can be tamed. *H. tuberosus*, Jerusalem artichoke, is second only to the preceding for mass effect. It does not spread so rapidly, and its copious tubers, though troublesome, can be eradicated if desired. I have cleaned two patches. As yet, it is only suitable for mass effects, where tall herbs are in order. *H. grosseserratus* is one of the most promising members of the genus. A vigorous grower, especially in moist soil, it spreads less rapidly than the two preceding, and can be fairly easily kept in place. In the wild it shows more variation than any other of our yellow composites. Some plants are 8 feet tall, others 4 feet. Some have dense inflorescences, and crowded heads; some have loose inflorescences with long-stalked heads. Some have narrow, distant rays; some have broad, overlapping rays. And there are unmistakable signs of doubling. With all these beginnings in the wild, what might not be done by the breeder? The plant itself is rather coarse, and loses its lower leaves in late summer. But it may well give rise to several forms as good as "Golden Glow," and by its hardiness and prolific progeny give flowers for everybody.

Rudbeckia subtomentosa comes of a stock which has already high repute. But this species appears to have no place in garden lore. A very strong hardy perennial plant, it is also copiously floriferous. The big deep yellow rays surround a dark brown disk, and the heads are borne in graceful open bunches. Each flower is about 3 inches across. A single clump will bear a mass of gold and brown from 3 to 6 feet in diameter. With good light the stalks grow stiff and strong to a height of 3 to 5 feet. It does not run out of place, but enlarges gradually like



ALL THREE ARE FORMS OF *HELIANTHUS GROSSE-SERRATUS*

its relative the Golden Glow. No amount of sunshine injures it. A very dry season may blight the flowers. In partial shade it may stretch too tall and fall over. Altogether, the wild plants, transplanted to the garden, belong at once among the most satisfactory of hardy perennials. Variations in the field are not noticeable, though some slight differences of ray occur.

We have reserved till last the most individualistic of the yellow composites, *Lepachys pinnata*. By nature it is wild, informal, picturesque. No heat or cold or drought affect it. By the roadside we find two or three stalks to a root. But in the garden the clump is large, round, and slowly widening year by year. A wealth of basal leaves keeps it always neat and trim to the very ground. Then in August the slender stems rise in great numbers, bearing their groups of long-enduring blossoms to a height of about 3 feet. The mass of bloom is very conspicuous. The long hemispheric disk is of a brownish or blackish color; the rays depend from it all around at various angles in the most jaunty fashion. Already many variations are ready to hand along the roadside. There are broad rays and narrow rays, straight rays and twisted rays, pendant and half-pendant rays. In each respect the several heads on one plant are alike, showing the inherent nature of the differences.

This is but a hint of the many horticultural possibilities of the prairie flora. All of the ordinary prairie plants that we have tried take kindly to cultivation. Accustomed as they are to a dense sod, to extremes of drought and cold, and to very intense light, they are all liable to overgrow and fall down when placed in loose, rich, moist soil, and the insolation of a sea-level atmosphere. This has actually happened with several species which we have sent to Philadelphia. Such a matter, however, can easily be overcome. The enrichment of all our gardens—the production of more and better flowers for everybody—merely awaits the thoughtful care of a skilled gardener.

Grinnell, Iowa.



LEPACHYS PINNATA
BY NATURE WILD, INFORMAL,
PICTURESQUE

Book Reviews

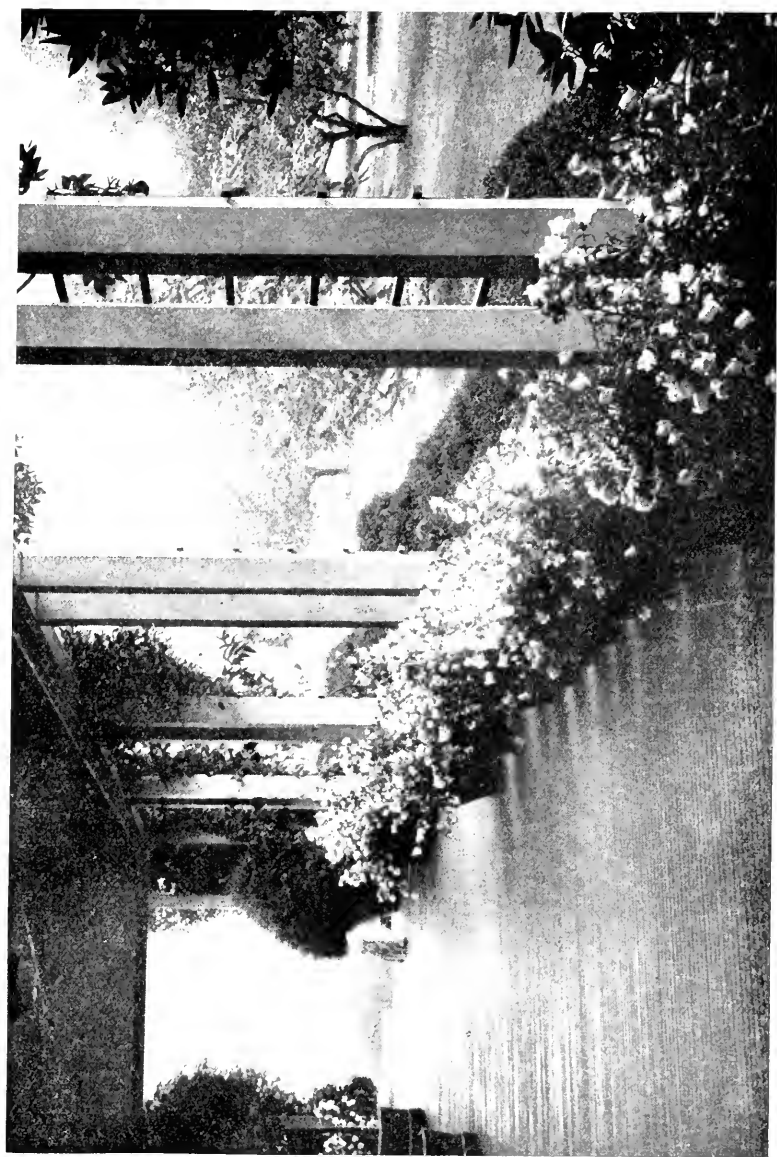
Around the Year in the Garden. By FREDERICK FRYE ROCKWELL. (350 pp. Macmillan Company, New York. \$1.55.)

We have become so accustomed to the publication of books on special plants or kinds of gardening that it would seem to be impossible to give in one volume the information necessary to the amateur who desires to lay out and maintain a garden that will be profitable, attractive and interesting throughout the year. The author however, covers the whole field of garden operations and deals with all the kinds of plants in which the amateur is likely to be interested. This has only been possible by crowding each page with useful matter.

The book is divided into chapters representing each week of the year and the title of the chapter indicates, in a general way, the operations or suggestions which seem most applicable to the period it covers. There are sub-titles through the chapters which draw attention to the particular matters under discussion. There is a good index making it easy to find any information sought for. The book is well illustrated and the subjects evidently carefully chosen, most of them showing operations or devices in gardening.

One is struck by the care taken to give the reasons for doing things in addition to the mere directions, which too many authors seem to think are sufficient. The writer gives many little devices or "wrinkles," the knowledge of which is usually obtained either by long experience in gardening oneself, or by observing the methods adopted by others. These often save expense and give much satisfaction when one has little to spend on the garden.

The author points out that while his recommendations could be carried out quite successfully at other than the suggested times, the intelligent reader will readily understand that the best time for various operations will vary in different climates. The author does not, we think, give enough information in regard to methods which should be followed in the colder parts of America. There is some repetition of matter in the book, recommendations made or methods dealt with in some chapters being practically repeated in others. More details are given in regard to vegetable garden-



POTTED CAMPANULAS ON A PORCH

ing than to fruits or flowers. The lists of varieties are short, and descriptions, where there are any given, are brief. There are more mis-spelled words among the names of varieties, particularly of flowers, than there should be, which it is hoped will be corrected in future editions.

The book is written in an interesting, readable style, and the author evidently endeavors to make his readers feel that he is anxious to help them and, we think, has succeeded.

Considering the wide field covered, and the full, practical, and reliable information given, we consider "All the Year in the Garden" one of the best books for the amateur that has been written.—W. T. MACOUN.

Ottawa.

The Natural Style in Landscape Gardening. By FRANK A. WAUGH. (Richard G. Badger, Publisher, Boston. \$2.50.)

This is a valuable little treatise, the result of years of study and observation of a subject of interest to practically everyone. It is safe to say that of all land treated and used for ornament, from the city lot to the largest park, at least 90 per cent is laid out in what is called the natural or informal style, which, in the last analysis, is derived either from the natural or the agricultural landscape, this latter being not really natural, but artificial, the product of the operations of man. That a great deal of it is laid out badly is no reflection on the style. The author points out how important a part of the things within our consciousness is the landscape (which might be defined as everything beyond the city, the mine or factory) as a thing of unremarked acceptance like the atmosphere, yet a refuge to which everyone resorts at one time or another, and analyses and discusses it as a basis and inspiration of design. He advises the student to steep himself in the various phases of the natural landscape until he has absorbed their spirit and can apply it to the far different problems of the suburban lot or the state park. How this is to be done is difficult to explain and understand except to those who can understand without explanation.

Perhaps it is better that the book does not go far into the question of applying the principles or spirit of the landscape to the common problems of the private "place." It is thus a more complete and consistent unit, a call of the wild to the designer to trace his design to its ultimate source.

The sensible and refreshing remarks on color are much to be commended, more especially to those who think that color is the most important thing in a garden and structure secondary. The reader can hardly fail to profit by his efforts to understand the spirit of the landscape and the spirit of Professor Waugh.—HAROLD A. CAPARN.

The Peaches of New York. By U. P. HEDRICK. (541 pp. 97 Colored Illustrations. Geneva, N. Y. 1917.)

The Peaches of New York is the fifth of the fruit books published by the New York Agricultural Experiment Station. The plan of the Station seems to be to make a complete record of the different fruits grown in this region. The first four books are on apples, grapes, plums and cherries, issued in the order named. The book is published under the direction of U. P. Hedrick, Horticulturist of the Station, his assistants being the members of the department of which he has charge.

The title implies that *The Peaches of New York* is written for the confines of the State; but all the varieties of the peach grown in North America, as well as many known only in other continents, have been considered, presumably under the supposition that all might be grown in New York, and that all may, therefore, be of interest to the peach-growers of that State. The design seems to have been to make the book as complete a record as possible of the development of the peach, wherever grown, up to this time. *The Peaches of New York* is, then, an encyclopedia of the peach. One wonders what could be found to put in a book of 541 pages, 12 by 9 inches in size, on the peach. Enlarging somewhat on the table of contents we find that the book contains:

An account of the history and uses of the peach; a discussion of the botanical characters of the species of cultivated peaches; a discussion of horticultural classifications of the peach; an account of the peach regions and of peach-growing in America; a chapter on peach-growing in New York; and, lastly, and in greatest detail, the synonymy, bibliography, economic status and full descriptions of all important cultivated peaches with briefer notices of varieties of minor importance, and of those appearing in peach literature which are now no longer grown. In footnotes running through the text biographical sketches are published of the persons who have done most in America toward improving the peach. Throughout the book there is much that will be helpful to those who are breeding peaches. So, too, there is a good deal that should be of interest to students of ecology.

As in the preceding fruit-books, color-plates occupy prominent places in this volume. Pains and expense have not been spared in the attempt to make the plates the best possible with the present knowledge of reproduction in color. Those who are familiar with the preceding books in the series cannot help but see that the technical processes of color printing have been greatly improved since the first books were published; for, though the photographing of peaches is much more difficult than the photographing of apples, the color-plates of the present volume are much superior to

those in the apple book, the first of the series to be published. The illustrations are life-size of the peaches as they grow on the grounds of the New York Agricultural Experiment Station at Geneva.

The author has made an exhaustive study of the history of the peach and presents much evidence to show that the original home of the peach is China and not Persia as the scientific name of the fruit, *Prunus persica*, indicates, and as laymen have long believed. Copious accounts of wild peaches recently collected by various explorers in different parts of China are given to show that this fruit is still truly wild in central and eastern Asia. The development of the peach is traced with more or less detail as a cultivated plant, beginning 2000 years before Christ, in Asiatic, European and American countries.

The botany of the peach, as compared with its congeners, the plum and the cherry, is simple indeed, and is so well agreed upon by botanical writers that the place in botany of the several species of peaches of interest to fruit-growers needs little discussion and the book is, therefore, almost wholly a horticultural one. Yet, several pages are devoted to the botany of the peach to make plainer, to the horticulturist at least, the botany of this fruit.

In discussing the botany of the peach ten fruit-characters that differentiate the races and varieties of cultivated peaches of Europe and America are named as follows: Downy skin, smooth skin, white flesh, yellow flesh, red flesh, flesh clinging to the stone, flesh free from the stone, shape more or less round, shape round with beaked fruit, shape distinctly flat. All of these characters are found in the native peaches of China and two additional characters are found in Chinese peaches not as yet noted elsewhere. These are: Peaches with a white stone and peaches that keep, as do apples, for several months after picking. The author suggests that peaches in western countries might be improved by the interjection of these new characters, and that possibly there are other types of peaches in China that might be valuable if introduced to western culture.

A chapter on Commercial Peach-Growing in America contains the history of the peach in the New World, interesting not only from an historical standpoint but also because it gives an account of the development of the peach in North and South America with all the ups and downs of the industry in the northern continent. One gets from this chapter an idea of the magnitude of the peach industry in the United States. One is surprised to learn that the value of the peach crop in 1909 as given in the census of 1910 is \$28,781,078.00, second only to the value of the apple crop. In this chapter, too, is given an account of the uses and the by-products of the peach.

The peach seems to be profoundly influenced by soil, climate and culture. This is brought out in the chapter on Peach Growing in New York in which the peach-regions of the State are discussed. In this part of the book, too, is found much information to serve the prospective planter in the selection of locations and soils and in the cultivation of the peach. Climatic conditions, moisture, soil, exposure, cultivation, fertilization, pruning, insects and diseases with methods of control, are all here treated.

Possibly the chief contribution *The Peaches of New York* makes to pomology is in its descriptions of varieties. All who grow or use peaches are dependent on description of fruit and tree for the identification of varieties. In this work 2,181 varieties of peaches are described. Of these, 88 sorts are classed as leading varieties, the others as minor varieties. The leading varieties are illustrated with color plates. From the descriptions and color plates one should be able to get a very good mental picture of the fruit.

The following peaches are named as standard varieties: Elberta is the mainstay of all the peach districts of the State, coming in as a mid-season crop; Greensboro, Carman, Champion, Belle, white-fleshed sorts, the St. John, Fitzgerald, Niagara and Early Crawford, yellow-fleshed, are standard varieties preceding Elberta in the markets. The most popular sorts following Elberta are Oldmixon Free, white-fleshed, and Crosby, Late Crawford, Kalamazoo, Chili Smock and Salwey, yellow-fleshed sorts.

Varieties have been described with other ends in view than identification. Chief of these is the effort to set forth the elementary characters or unit characters of the peach. In accordance with the view that the characters of plants are independent entities, thrown into various relationships with each other in individual plants, and that on this conception of unit characters the improvement of plants is founded, an effort is made to discover what seem to be unit characters in peaches, thereby aiding in building a foundation for breeding peaches.

In the use of horticultural names, lacking a better code, the author has used the revised rules of the American Pomological Society. This book should set straight, in a high degree, the great confusion in the names of peaches, but that it could bring perfection out of chaos no one could expect. Many references from standard texts are given for each variety, but only those used in ascertaining the history and the economic status or in verifying the description of the variety. Synonyms created by pomologists are given but not synonyms quoted by other writers.*

* This review, the writer of which wishes to remain anonymous, is longer than the *Journal* can usually print. The importance of the book it discusses with such discriminating care, its splendid colored illustrations and monographic character make it one that all growers of the Peach should be glad to own.—ED.

Notes and News

During the agitation for increased growing of garden and farm crops last year the National Special Aid Society was among the first to coöperate with Miss Virginia Gildersleeve, the Chairman of the Mayor's Committee of Women on National Defence, in studying what work women might reasonably do to help out the scarcity of garden and farm labor. The outline of their "Unit Plan" submitted to Mrs. Charles Frederick Hoffman, Chairman of the Agricultural Department of the National Special Aid is printed herewith, and that the idea was a sound one is shown by the success of numerous camps throughout the country organized along the lines suggested.

A UNIT PLAN FOR AGRICULTURAL WORKERS

Purpose. To increase the food supply there is great need of more labor on farms. Women have demonstrated in Europe that they are able to perform efficiently almost every kind of farm work. In this country three types of women are available for such work.

1. Educated women, such as college students and teachers, who wish to devote the long summer vacation to this form of patriotic service.

2. All-round working women, strong but unskilled, who may be turned permanently to farm labor.

3. Factory workers in the seasonal trades, thrown out of their regular employment in the summer, who would profit physically and socially as well as financially from a few months of farm work.

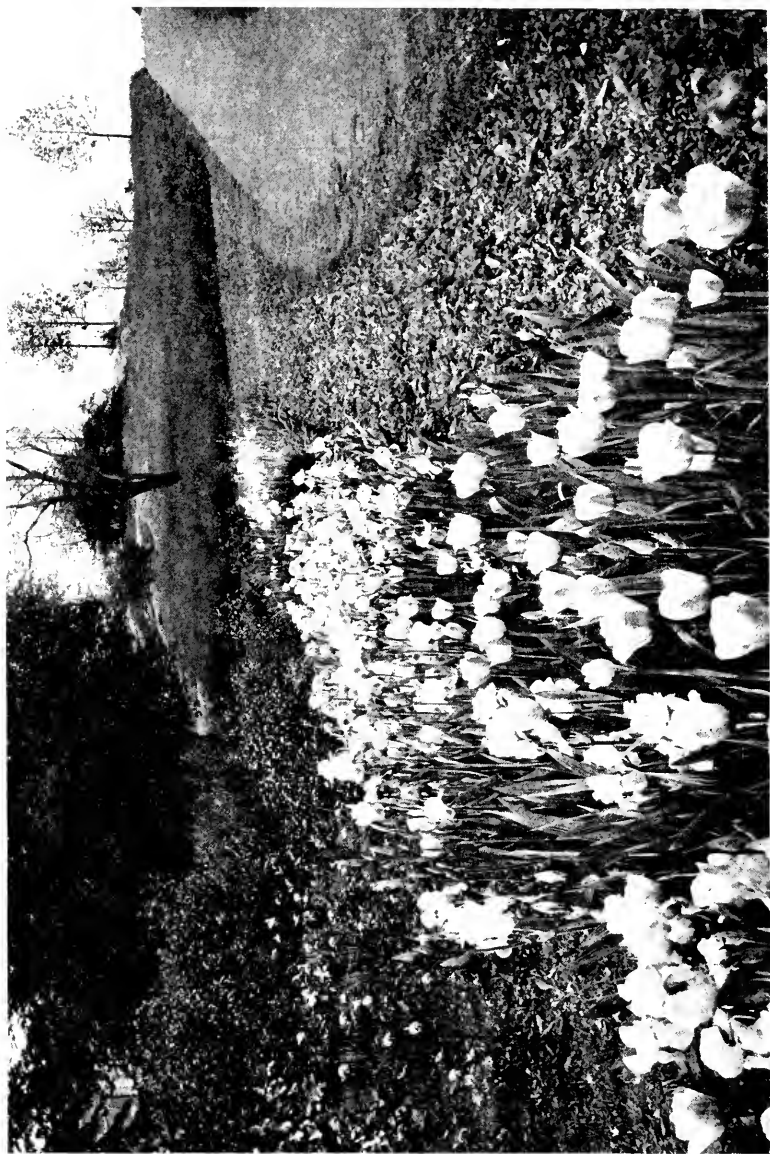
Most farmers in this part of the country are not used to women as farm laborers; they must be persuaded to try them and be convinced of their value. One great difficulty in the way of introducing women into this work is the impossibility of housing and feeding them conveniently in the farmer's household.

The Unit. To meet this situation the Unit Plan is proposed,—i.e., the organization of groups of women workers, numbering from about six to fifty or more, who shall live and eat together in a centre, and go out from there singly or in squads to work by the day on farms or estates in the vicinity.

Residence. The members of the Unit may live in a house, unused and loaned for the purpose, in a barn temporarily fitted up for camping, or in tents.

Food. The catering and cooking may be done by one or more dietitians or cooks, who may be members of the Unit or women hired for the purpose.

Transportation. The workers may be carried to their work by motor-cars or other vehicles owned by the Unit or loaned by neighbors or employers.



DARWIN TULIP EUTERPE (Planted 25 February, 1917)
FLOWERING WITH IRIS
NEW YORK BOTANICAL GARDEN

Wages. There are at least two practicable systems of arranging wages. The Unit may pay each member a regular weekly wage and board and receive from the employer all money earned by the workers; or the workers may themselves receive from their employers the pay per day or by piece work and share the expenses of the household.

Supervision. A supervisor should be in charge of the Unit. She may be one of the workers, more mature than the others and fitted for leadership, or some volunteer experienced in managing young women.

Careful bookkeeping is necessary in order that the wages and expense accounts may be properly managed. In small Units this may be done by the supervisor, or some interested volunteer from the neighborhood may undertake it.

Capital. Some capital is generally necessary to start the Unit, though the money may afterwards be refunded from the earnings of the workers.

Equipment may be purchased for a small sum, and often much of it, such as simple furniture, may be given or loaned from neighboring households.

Physical Examinations. No woman should be enrolled in the Unit unless she has been carefully examined by a physician and pronounced physically fit. All women workers sent out by the Standing Committee on Agriculture have been certified in this way.

Variations. There may be many variations of this typical Unit, according to the nature of the locality, the kind of farm work needed, the women available and the resources at hand.

For example, in a fruit country the workers may all do piece work on one farm, instead of scattering during the day. Under other conditions the Unit may be organized as a training camp, with an agricultural expert to teach the women various forms of agriculture. Occasionally it may be possible to induce the workers to go out from the centre to assist farmers' wives in household work. Sometimes it may be convenient for a small Unit to board with some family, instead of doing its own catering. Many other adaptations are possible to meet local needs and conditions.

[Issued by the Standing Committee on Agriculture of the Mayor's Committee of Women on National Defense, 6 East 39th Street, New York City.]

During December the New York Botanical Garden closed one large range of greenhouses on account of the coal shortage. Thousands of plants were moved about a mile in severe weather to the old Conservatory Range, without the loss of a single plant. On January 10, the Brooklyn Botanic Garden closed its greenhouses to the public and crowded its collections into about half their usual space. The greenhouses of the Park Department at Brooklyn have burned wood for part of the winter and hundreds of private conservatories have either closed down altogether or else much reduced the space to be heated.

While there has thus been coöperation on the part of practically everyone using greenhouses, and the saving of fuel consequently has been considerable, a tendency in some quarters to advocate their inclusion among the "non-essential" industries has called forth a well-merited storm of protest from those who are in the business. There has been no fairer statement of

the difficulties of the florists than a letter written by Mr. Wallace R. Pier-son to the *Hartford Courant* which it is a privilege to reprint here. The meaning of flowers to all of us is so well epitomized in one paragraph of this letter that it has been featured on the first page of this issue.

The attention of the writer has been drawn to a recent speech delivered in Hartford, in which the speaker chose for the subject of his remarks the apparent waste in certain lines by the citizens of our own good state, and saw fit to set forth in his remarks that coal used for greenhouse purposes is wasted and is a loss to the nation. "The idea of giving an orchid to a lady in war times!" or something to that effect, leads one to wonder if the speaker ever stooped to pick the first dandelion of spring or knows a bank where arbutus may be found, for the remark is not compatible with such a man, in my opinion. There is something lacking. It may be a love of nature or an entire lack of sense of the beautiful. "And to think they burn coal to keep such trifles warm!"

The figures quoted were incorrect, but that doesn't affect the issue. He undoubtedly did not realize that his remarks were a direct attack, not upon an individual, but upon an industry that amounted last season in the United States to \$100,000,000 and upon which thousands depend for their livelihood. He did not realize that one night without coal at this season means ruin not only for the present but for the future, because the tender plants gathered together in greenhouses cannot be replaced and would be a total loss to the world.

The injustice of that statement is apparent to all sound-thinking persons. On Tuesday of last week in Washington I listened to Mr. Snead, who is in active charge of coal distribution in the United States, and also to Mr. Noyes, who is in charge of fuel conservation. I should like to place before your readers the remarks of these gentlemen who represent the government and whose message to the florists of America is the message of a government to its people. These are men whose word can be accepted as conveying judgments that are based on facts and common sense. I quote Mr. Snead as correctly as to wording as memory will permit and absolutely correct as to fact and intent.

"This government realizes that every industry which is and has been considered legitimate and which has been considered an asset to the nation, must survive this war to make places for those who will return to industry from the front and from the munition plants at the close of the war. We do not recognize the term 'non-essential' for we realize that for the best welfare of the country your industry and other industries not directly connected with the manufacture of munitions are necessary and essential. It is your duty to so conduct your business that at the end of the war you will be in a position to absorb and use a large portion of the labor that will be released. There is no intention on the part of the government to injure your industry or to interfere with it. We suggest that all available space be used for food crops and that your industry takes upon itself the duty of seeing that vegetable plants are produced in sufficient quantity to stock the gardens of the nation."

Mr. Noyes, in addressing the gathering of florists, stated that there must be saved in this country 50,000,000 tons of coal and that this amount must be saved without the ruination of any industry. "Burn less coal but save your crops and your business for they are needed by the nation. The priority list must be taken care of first but there is coal enough to care for other industries if care is used in consumption and the proper distribution is effected."

Flowers are a necessity to a people. There is a limit to human strength and endurance, and the relaxation which comes to the mind by having flowers in the home, garden or hospital is a thing of reality to those who know and love flowers. Here in America we are not yet fully acquainted with casualty lists and when they come, as we fear they will, flowers will express to the mother what words cannot express. "How France Honors Her Dead" was the title of a picture of a French war-grave published in the Red Cross Magazine, and the mass of flowers told the story that flowers carry the last message to those who have gone beyond. My mail today brought me a letter from a French florist telling of the shortage of rose plants in France, due not to the war causing less production but because the war is making roses a necessity to those who sorrow. The record of flowers in America is such that no man should question it.

The florists of America point with pride to their boys in the army and navy. Over half a hundred have gone out from Cromwell and among them four commissioned officers who grew flowers and who may again grow flowers if the fates are kind. We are also proud of the fact that \$27,000 was raised for the Red Cross by the New York Flower Shows and that donations to the Red Cross have been made by the florists' clubs of America. We believe that just as France, the great flower-loving nation, has saved the soul of Europe, so the love of nature and all that is good and beautiful in the world and the love of right and justice will save the American people from hysteria and from themselves.

Be saving, be honest, be natural and be just, and your part toward the glorious end will be accomplished.

To those who grow corn in the warmer parts of the country a pamphlet by G. M. Collins and J. H. Kempton on "Breeding Sweet Corn Resistant to the Corn Earworm" will be of special interest. It discusses the ravages of the corn earworm (*Chloridea obsoleta* Fab), the protection of the ears by husks, the breeding of different strains that may prove resistant, especially along the lines of increasing the length of the husk which seems to be correlated with low damage. The pamphlet of 24 pages was originally printed in the *Journal of Agricultural Research*, December 10, 1917.

Inquiries have come in regarding an insect enemy of the peach, which also attacks plum and cherry trees. Mr. G. T. Powell of Ghent, New York, in a recent letter says that this new trouble of the trees of the plum family threatens to be as destructive as the chestnut blight. In the *Journal of Agricultural Research*, of November 20, 1916, A. L. Quaintance and W. B. Wood discuss this pest. It is *Laspeyresia molesta*, a new species of insect found first in the District of Columbia, and now more widely spread. There does not seem to be any effective way of dealing with this insect which attacks both the twigs and fruit.

Charles E. Faxon, assistant director of the Arnold Arboretum and a distinguished botanist and illustrator, died on Wednesday, February 6, at his home in Jamaica Plain, Mass., in his 73d year. He was a graduate of the Lawrence Scientific School and an instructor of botany at

Harvard from 1879 to 1884. In 1907 he was made an honorary master of arts by Harvard. Mr. Faxon was famous throughout the country as the illustrator of the great series of publications from the Arnold Arboretum, notably Sargent's *Sylva, Manual*, and many other smaller works.

A traveling exhibit composed of the most successful recent work in Landscape Architecture will soon be available for general exhibition purposes. Though primarily educational, this exhibit will be attractively arranged on mounts of two or three standard sizes, the maximum being 30 by 40 inches, and will consist of photographs, perspective drawings, elevations and sections, and rendered plans. A few larger plans and models may be secured by special request.

The exhibit will be available in whole or in part. Subjects exhibited include certain of the problems in City Planning and Residential Subdivisions, Park and Modern Cemetery developments, private grounds for the Small Home as well as the Large Estate, Gardens of all styles and types, Country Clubs and Institutional Grounds such as Schools, Hospitals, etc.

A small charge will be made, based on cost of transportation, insurance and the length of time that the exhibit is desired. Any organizations interested may secure engagements or obtain more complete information by writing to Mr. John Noyes, Chairman Exhibition Committee, American Society of Landscape Architects, Central National Bank Building, St. Louis, Mo.

Journal of the
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JUNE, 1918

No. 2

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"NEVIS", BUILT BY ALEXANDER HAMILTON'S SON, JAMES HAMILTON IN 1835
LEASED BY THE INTERNATIONAL GARDEN CLUB FOR ITS WAR WORK

We know not why, but it has always been in war times and periods of great disturbance that men and women have turned toward the growing of flowers. The greatest development of the Queen of Flowers had its roots in the vast revolutionary upheaval preceding and during the Napoleonic Wars. It was the love of the Empress Josephine for her garden, and especially for the rose, which started its modern development, and there is an order still preserved in the British Admiralty that when French ships were captured in the War, any plants or seeds that were on board for Madame Bonaparte were to be expedited.

In the brutality and cruelty of the present conflict, it is all the more important to preserve those things which make for the finer side of humanity.

"There are two books," says Sir Thomas Browne, "from whence I collect my Divinity; besides that written one of God, another of his servant, Nature—that universal and public manuscript that lies expanded unto the eyes of all. Those that never saw Him in the one have discovered Him in the other."

I think in the same way, in this our time of distraction and sorrow, in the upheaval of our normal lives, we turn to those mute but tender consolers, the flowers, the trees, and all those sympathetic, if silent, manifestations of a divine creation which surround us. I only regret that the great municipal rose-garden which the International Garden Club has projected for the city of New York is not existing and ready to do its share in bringing inspiration, relief, and peace to the wounded among our people in this torn and agitated time.

"Flowers are a necessity to a people. There is a limit to human strength and endurance, and the relaxation which comes to the mind by having flowers in the home, garden or hospital is a thing of reality to those who know and love flowers. A recent letter from a French florist tells of the shortage of rose plants in France, due not to the war causing less production, but because the war is making roses a necessity to those who sorrow."—*Zelia K. Hoffman*.
Extract from the American Rose Annual, 1918.



JAPANESE TREE PEONY

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Peony Culture in America

By A. P. Saunders, Secretary of the American Peony Society



THE growing of Peonies in Europe goes back almost as far as the history of gardening, but the peony in European gardens in olden times was generally *P. officinalis*, the "old double crimson," or some of its relatives—not the magnificent forms of *P. sinensis* which we usually have in mind in these days when we think of the peony.

To get a right perspective on peony culture in Europe as well as in America we must be more precise as to what we mean by "peonies." There are for garden purposes three principal groups of these plants, developed from the three species, *Paeonia officinalis*, *P. sinensis* (*albiflora*) and *P. moutan*. The first is native to Europe; the other two are Chinese species both of which have been in cultivation in the East for centuries upon centuries. Not improbably there were peonies adorning the gardens of China when Alfred the Great ruled in England. The peony as a garden flower—by which I mean not simply the plant in its wild form, but improved varieties derived from it gradually under cultivation—is therefore of great antiquity.



JAPANESE TREE
PEONY

But in European gardens and hence also in America, the peony of the East was unknown before the beginning of the nineteenth century. Most of the earlier references to peonies in American gardening literature up to about 1830 may safely be referred to the varieties of *P. officinalis* the double crimson form of which is today one of the most widely disseminated of garden plants in the eastern parts of this country. During the earlier decades of the nineteenth century began the introduction of peonies from the far East into the Western world. A few plants had found their way into England in the last years of the preceding century, travelling merchants having brought tree peonies to Sir Joseph Banks in 1794. The first Chinese herbaceous peonies probably reached Europe some years later.

Paeonia sinensis is, like *P. officinalis*, an herbaceous plant; and the *sinensis* varieties, "Chinese peonies," are the staple of peony culture in both this country and Europe today; all the seedling peonies of American origin that have come into commerce, are "Chinese" peonies. *P. moutan* is shrubby; it bears the name tree peony, yet the largest tree peonies if considered as trees, would be very small trees indeed. But the plant does form a bush, and in favorable situations will reach a height of 5 to 10 feet; rarely more. The tree peony has never attained in the Western world a popularity at all commensurate with its surpassing beauty. The Chinese call it the King of Flowers and give the best evidence of their appreciation of its merits through having taken pains to produce so many grand forms of it.

The culture of tree peonies offers some difficulties, which may explain the comparative neglect from which the plant has suffered. Propagation with the tree peony is by no means as easy as with the herbaceous species. The plant sends out long straggling fleshy roots far down into the soil. These all meet together at the top and are connected to a single stem which emerges from the ground, branches somewhat higher up, and forms each year upon the branches the buds for the next year's growth. Since there is, at least on young plants, but a single stem at the crown, the division of the crown, which

would involve the splitting of this stem, would be more likely to kill the plant than to multiply it. Cuttings can of course be made, but on this curious, brittle woody stem roots form only slowly, and attempts to produce new stock in this way, unless conducted with great skill and care, will lead in time only to a little cemetery of dead sticks. Buds will sometimes form on fragments of root from near the surface, but propagation by this means is uncertain. Layering may be tried, and a stem well layered does root nicely in a year or two, but with such inelastic stems, layers are not easily made, and offer but a slow promise of increase at the best. For the amateur grower however this is probably the best method by which to effect a gradual multiplication of his choicest kinds. The professional grower, who must have quicker results, has been driven to grafting as the best practicable means. This offers no special difficulty to a good worker; the difficulty comes in choosing a root on which to graft. The Japanese use as stock a vigorous type of tree peony itself, something perhaps not very far from the original wild plant. A section of stem of the sort to be propagated is inserted into the root of this primitive type, and in due time union is effected, and roots and stem begin to grow. And here one's troubles begin. For this vigorous stock forms buds rather freely on the roots, and within a year or two, if the plants are not very carefully watched, the graft is entirely smothered by the growths from the stock, and in place of the delicately colored blooms that were hoped for, the eye is greeted on some May day by a display of very large flowers of a rather ferocious magenta red.

European cultivators, in order to avoid this disaster, have used the roots of the herbaceous peony as stock. These have the advantage that they form no buds of their own, but the plants produced by this union have an uncertainty of bloom that is most exasperating; for they will sometimes grow for ten or twelve years in apparent comfort without producing a flower bud. Under favorable circumstances they will in time establish a root system of their own, striking out from about the point of union of stock and graft; and in this way fine vigorous

clumps will be formed; but it takes years of patient waiting on the part of the grower.

Evidently we should have tree peonies on their own roots, but since this means slow propagation in the nursery the plants will be rather high in price, and the amateur whose financial resources are limited will have to content himself with a small collection; he may well allow himself, however, in addition to his purchased roots, a little bed of seedlings—provided his resources of patience are not likewise limited. The seed germinates the second season after planting, and the young plants will not begin to bloom until several years after they begin their growth. But when these plants are once started, their possessor need have no worries over either stock or graft.

The marvellous qualities of the tree peony, whether in the glory of its satiny blooms or in the solidity of its thick leaves—looking often as if cast in bronze—make it worth any pains that may be necessary to make it succeed; and it is very much to be hoped that a day is coming when it will be more widely used in American gardens.

The propagation of tree peonies has never been carried out on anything more than a small scale in the United States. Almost all of the stock offered has been imported either from France or Japan. Quite recently one of our peony growers has imported from France a consignment of clumps established on their own roots, and from these a large number of own-root divisions have been made. These should prove much more satisfactory than any stock that has heretofore been obtainable, especially for northern gardens where the tree peony almost always kills back more or less in winter, not infrequently involving the death of the graft and loss of the plant.

The varieties of *P. sinensis*, unlike the tree peonies, are of the easiest culture and seem to thrive in almost any climate, provided it is not too gentle. The plant is most precious for northern regions. In the far northwest of the United States and Canada it flourishes, and glorifies the spring with its immense crop of flowers no less willingly than in the latitude of Philadelphia. Indeed the difficulties in the path of the peony

grower are much more considerable in Alabama than they are in Manitoba.

The propagation of the herbaceous peony offers no difficulties. Even the inexperienced grower can readily make divisions of any of his peonies he may wish to multiply. The plants are dug in the autumn, and will be found to consist of a group of straggling roots, united into a fleshy crown on which buds are formed here and there. The crown may be cut up with a sharp knife and every piece so separated that has a bud and a good piece of root, will be sure to grow. Plants that have been long established and have formed a very dense big root-system, are not easy to handle, and the beginner in dividing such specimens is likely to lose many large sections of root which break off without any bud.

It should be added that the peony profoundly resents being dug up and divided; the divisions give little or no bloom the first year following, and will not show typical bloom again until three or more years after the dissection of the parent plant. It is therefore very undesirable to divide or even to move peony plants unless one has a good reason for so doing.

The history of peony culture in America through its earlier years is for the most part simply a record of importation from across the Atlantic—and from France principally—first of the varieties brought to that country from Japan or China, and then later of the new sorts produced by continental growers as seedlings from these plants of Eastern origin. American nurserymen were quick to realize the value of the peony as a garden plant. William Prince, writing in 1828 of the popularity of peonies in Europe, says: "Anticipating that a similar taste would be evinced in this country, the writer has by a great exertion obtained every possible kind from Europe, and also a number from China." Prince then describes at length the varieties *Whitleyi*, *Humei*, and *fragrans*. He also states that at the time of writing, his collection contained forty varieties, combining a great diversity of shades and colors. It appears that in 1862 he obtained at considerable expense some twenty varieties of tree peonies from European gardens and

introduced them at Flushing, Long Island. He further says: "I have also originated from seeds during the past fifteen years twenty-two most gorgeous varieties, whose flowers are of the largest size, and comprise white, roseate, crimson, lilac, purple, and variegated shades."*

What happened to these seedlings it is probably impossible to ascertain, but it is safe to say that they did not find their way into commerce.

The earliest phase of peony culture—that of introduction and dissemination—merged somewhere in the fifties or sixties, into the second phase, when through the raising of seedlings new varieties began to be produced which later were to find an important place in commercial lists. Among the early growers of seedlings much the most important name is that of John Richardson (1798–1887) of Dorchester, Mass. Of Richardson's method of work we unfortunately know nothing, for he kept no records; but we know pretty well what he had to work upon, and the results we know. He worked with a rather limited collection of standard sorts, and from the small size of his garden we may be quite sure that he never had any very large number of seedlings at a time; yet he succeeded in developing some of the choicest varieties obtainable today. More than that; in the variety Walter Faxon he has produced a flower that is well described as possessing "the most exquisite shade of pink seen in a peony." The Chinese peony, though ranging in color from white through shades of delicate pink to the deepest reds, has always been lacking in full pinks of a really beautiful tone. Those salmon pinks, coppery and cherry reds, which are the special glory of the tree peony are only too painfully rare among the herbaceous sorts. The color is good in all of the Richardson varieties, but we owe an especial debt of gratitude to him for the variety Walter Faxon, which we may hope will prove the forerunner of a group of fine full pinks to replace those mauve pinks and pale megentas that have been too long tolerated in our gardens.

(* Quoted from *Descriptive Bulletin No. 259*, prepared by the Nomenclature Committee of the American Peony Society and Dr. J. Eliot Coit of Cornell University.)



John Richardson

(Courtesy of Massachusetts Horticultural Society)



SAMUEL HENSHAW PEONY

(Courtesy of Massachusetts Horticultural Society)

Richardson had a most rigid standard of excellence and would tolerate nothing among his seedlings that did not satisfy its requirements. He named only a very few of his own productions, and never introduced any into commerce. The propagation of them only began after his death, and it may well be doubted whether he would have given his approval to the dissemination of all of those which have since been named and offered for sale. There are however among them at least half a dozen kinds that are entitled to a place with the very best. *Grandiflora*, Walter Faxon, Milton Hill, Perfection, Norfolk, and Dorchester, are all of the highest quality, the first three of them unsurpassed in their respective types. Samuel Henshaw is a flower of quite extraordinary size and beauty, but the plant has the serious defect of not always developing its blooms.*

Boston has always been a centre of culture for peonies, probably in large measure through the encouragement given by the annual exhibitions of the Massachusetts Horticultural Society, and one of the most active and prolific of American Growers was George Hollis, who lived and worked at South Weymouth, Mass. Unfortunately Hollis saw too much of beauty in his own blooms, and put on to the market a large number of seedlings, leaving to other growers much of the task of elimination.

Seedling peonies do not generally bloom until seven or eight years after the sowing of the seed. Young plants that have been tended for so long a time do gain a lodgment in the affections of the grower, and it calls for a great hardening of the heart, of which not everyone is capable, to dig them up and throw them on the rubbish heap. The natural human reaction is to find at least all the beauty there is in them, and to give the plant the benefit of the doubt in the question of its superiority to already existing kinds. Some of Hollis's seedlings are of high quality, but they have suffered in the peony

* Any one who wishes to learn more regarding the work and personality of Richardson will find in the *Transactions of the Massachusetts Horticultural Society* for 1904 a most interesting article by Prof. R. T. Jackson.



RICHARDSON'S
GRANDIFLORA PEONY



KARL ROSENFELD

world from the bad impression made by the inferior sorts; hence Hollis has not yet been given his full meed of appreciation. In the descriptive bulletins prepared by the Nomenclature Committee of the American Peony Society, 66 of his seedlings are described, of which a bare half dozen are ranked as very good, while those classed as medium, poor, or worthless, include about 40 kinds. It is greatly to be regretted that Hollis did not practise a more rigid criticism of his own productions. He raised seedlings on a very large scale and his productions embrace an unusual variety of types. His own catalogue of 1907 lists 100 double or semi-double varieties and 25 of the Japanese type. Not all of these were offered for sale at that time, and a considerable number of them have never really been "in the trade;" many have been or will be discarded. But when the final reckoning comes to be made it will unquestionably be found that Hollis has added several varieties of great beauty and of permanent value to our lists. Among these may be named Maud L. Richardson, George Washington, Beauty's Mask; perhaps Loveliness, Standard Bearer, Welcome Guest, Glory; possibly still others.

The late Prof. C. S. Minot of Harvard, in addition to his remarkable gifts as a scientist, was endowed with a high enthusiasm for horticulture. Some of his seedling peonies have been staged in exhibitions, but none of them have as yet found their way into the channels of trade, and it is therefore too soon to pass judgment on their merits, though his variety Mrs. C. S. Minot was very fine at Boston last year.

Mr. E. J. Shaylor of Auburndale, Mass., a grower and enthusiast of many years standing, has in late years put out a small group of seedlings which have attracted much attention and bid fair to make a name for themselves. Fine blooms of Georgiana Shaylor, Frances Shaylor, Milton Lockwood, and some others, have recently appeared on the exhibition tables; the peony world is watching the progress of these seedlings towards fame.

The Messrs. Thurlow of West Newbury, Mass., have had under observation for a good many years a large block of

seedlings. They have been very conservative in placing any of these on the market, and it is still too soon to hazard a guess as to what their plots may produce. Only a few years ago a dark red sort was staged by these growers, and offered to the public, under the name Cherry Hill. This fine variety is a valuable addition to peonies of its color, of which we have still too few good ones.

While these labors of patience have been going on in New England there has been no less activity in the West. The peony has had a prophet there, in the person of Mr. C. S. Harrison of York, Nebraska. Mr. Harrison has for years proclaimed the peony as the ideal decorative plant for western and northwestern gardens, and his enthusiasm has done much for the present popularity of the peony in that part of the country. And the natural sequence of its dissemination has appeared in efforts to bring out new and improved sorts. Unfortunately distances are great in the West, and until very recently there have been no exhibitions like those of the Massachusetts Society at which new seedlings, candidates for fame, might be brought to face the best of European and American standard varieties. In the West each grower had his own collection, and usually nothing else, to set him a standard. The result was inevitable; many a seedling has been named, propagated, and placed upon the market only to find after some years that it had already been surpassed by an older sort. In spite of this, we owe some fine sorts to our western growers.

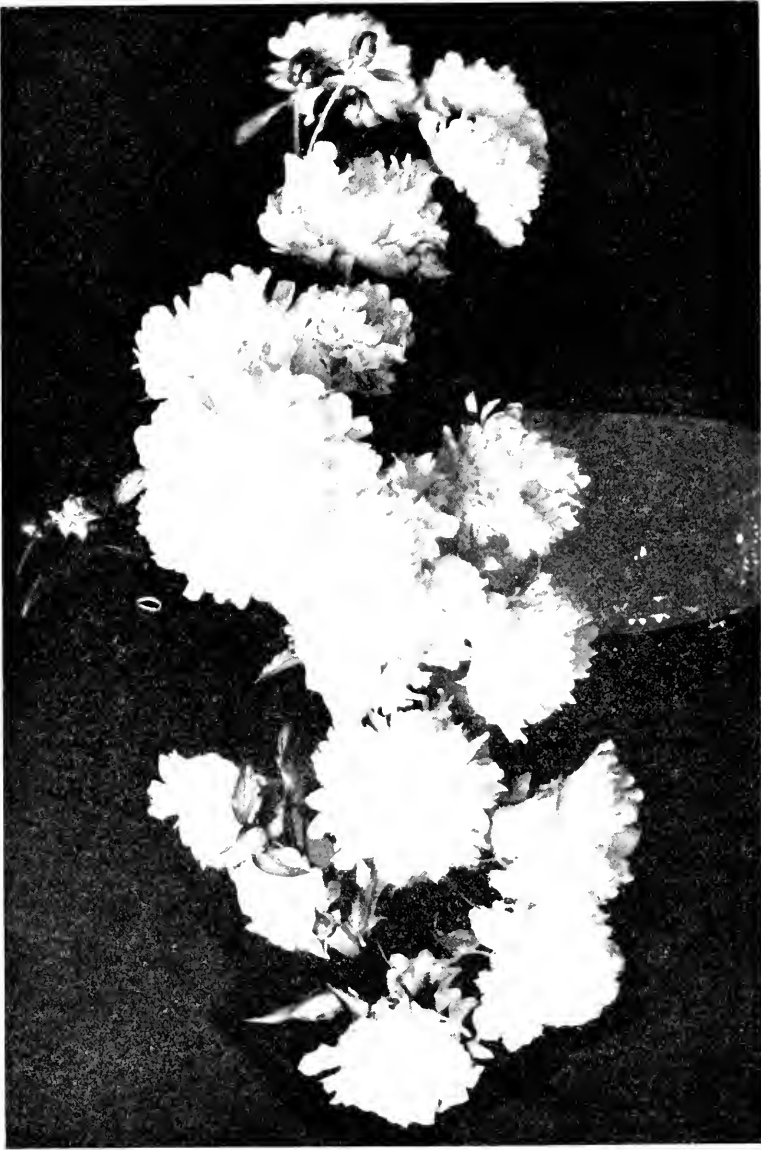
Mr. H. A. Terry, often called Father Terry, began the cultivation of seedlings at his home in Crescent, Iowa, at about the same time with John Richardson in Massachusetts. From Mr. Terry's list of a hundred however, there will be only very few that will survive the test of time. Grover Cleveland, a very good dark red, will remain a standard variety for some years to come. Etta, and a few others, may perhaps also establish themselves in popular favor.

Mr. Rosenfield, of Omaha, has set a good example of care and conservatism in the selection of promising seedlings. To him we are indebted for a few fine kinds; among them Karl

Rosenfield, one of the best of the commercial dark reds and quite widely grown for cut bloom; Golden Harvest (nearly identical with the older sort Jeanne d'Arc), and a few others. Mr. Rosenfield is still at work, and we may hope for further good things from him.

Mrs. Sarah A. Pleas, who raised seedling peonies for a good many years in Indiana, is now spending the evening of her life in California. Mrs. Pleas has, like Mr. Hollis and Mr. Terry, been touched with overmuch tenderness towards the children of her garden. Nevertheless her seedling Jubilee carried off substantial honors at the great show in Philadelphia in 1917, and those who have the opportunity of comparing Mrs. Pleas' varieties, which are as yet not widely known, with standard sorts, tell us that Elwood Pleas, Midsummer Night's Dream, Opal, and possibly others in addition to Jubilee will yet establish their position with the best.

Of late years Mr. A. M. Brand of Faribault, Minnesota, has placed on the market a group of seedlings of his own raising, for which great things are predicted. It seems strange to the gardening public that peony growers should be so slow in recognizing the merits of a new sort, yet it is not difficult to explain why even six or eight years after the introduction of a new variety it may still be impossible to speak very positively as to its merits. What we call "new and sensational" peonies are as matter of fact older than one would believe. Thérèse, Le Cygne, Sarah Bernhardt, and many others which would be considered almost novelties, have all been on the market for more than ten years. The fundamental difficulty lies in the propagation. With the carnation or the rose propagation goes on very fast, by cuttings, or in the case of the rose, by budding. Within two or three years stock can probably be multiplied a hundred fold; whereas with the peony the rate of multiplication is not so good as in arithmetical progression, 1, 2, 4, 8, 16, and so on, for successive years. As a general rule a peony plant may be lifted every two years and cut into two or three divisions; which would give from one parent plant at the best only about 25 plants in six years. And even this slow rate of



JUBILEE (MRS. PILAS) GROWN BY
L. J. GERMAN, VAN WERT, OHIO



MILTON HILL PEONY

(Courtesy of Massachusetts Horticultural Society)

increase is not maintained when a variety is once placed on the market; for most plants then go into private collections where they are not further propagated at all. Hence even though the originator starts with a fair stock of a new sort when it is disseminated a good many years will elapse before plants will be available in any such numbers as will make its general distribution possible. And while stocks run low prices will run high. New varieties sometimes command prices as high as \$25 a root; and this not from pure cupidity on the part of the grower, but because he must protect himself against the danger of being "sold out" of his own variety.

These causes have conspired to make Mr. Brand's varieties as yet comparatively unknown in the East. Some of them have appeared on exhibition tables, and at the peony show in Philadelphia in June 1917 there were fine examples of Martha Bulloch, Longfellow, and Mary Brand. Growers in the middle west who are more familiar with Mr. Brand's productions claim even greater merits for some of the others, so there can be little doubt that several of these seedlings are destined in time to take a high place among the peonies of the future. Whatever success they achieve will be well merited, for their originator has spent years of enthusiastic effort over them, and they represent a selection from enormous numbers of seedlings.

Few even of the gardening public have any realization of the extent to which the peony is grown in America today. It is safe to say that nowhere else is the plant cultivated in such large areas, either for the sale of cut bloom, or for the propagation and sale of the roots.

Immense plantings have been made especially in the neighborhood of the larger cities, either for cut blooms alone or to combine the sale of blooms with that of the roots. There are many large nurseries in which the peony is almost an exclusive specialty, and in other more general nurseries acres upon acres of peony bloom may be seen in the spring season. Such plantings are to be found on Long Island and on the mainland near New York, in the neighborhood of Philadelphia, in



MARTHA BULLOCH (BRAND)



FIELD OF PEONIES IN A
WESTERN NURSERY

New Jersey, Ohio, Illinois, Indiana, and even in Oregon, and as far south as Missouri. No such representative collections could probably be found anywhere else in the world as may be seen in the gardens of some of our peony specialists; and there are many private gardens in which may be found collections of two or three hundred of the choicest varieties that now exist. The development of the peony specialist, professional or amateur, has been the work of the last ten or fifteen years, but it has gone on with amazing rapidity.

When we consider in the gross the achievement of American growers of seedlings we may well claim for them a large contribution of varieties of very high quality. At the same time as compared with the European sorts that have appeared in the same interval of time, we cannot claim that those produced here represent anything very new or distinctive. We have not succeeded in breaking into any new line either in form, color or habit. But while we have been following the beaten path, others have struck out in lines of their own. It is not many years back that Messrs. Lemoine and Sons of Nancy, France, put out a few new varieties of peony, the results of cross-fertilization by Chinese sorts on a pale yellow or cream colored species known as *Wittmanniana*. Here was something new; and in these sorts, *Le Printemps*, *Mai Fleuri*, *Avant Garde*, *Messagère*, we have a group of plants of exquisite beauty, unlike anything that existed before, early blooming, and though of short season, deserving of a place in our gardens for their singular charm. The same French firm have in recent years put upon the market two varieties, the results of crosses made from tree peonies on a yellow flowered shrubby peony discovered in 1882 in the mountains of southern China. One of these hybrids was shown in Philadelphia last June—a large double flower, with bright yellow petals, stained crimson at the base. Such hybrids as these mark epochs in peony culture because they open out new vistas to which time alone can set bounds.

And what of the future? There is still much to be done with the Chinese peony itself. For one thing, those of us who



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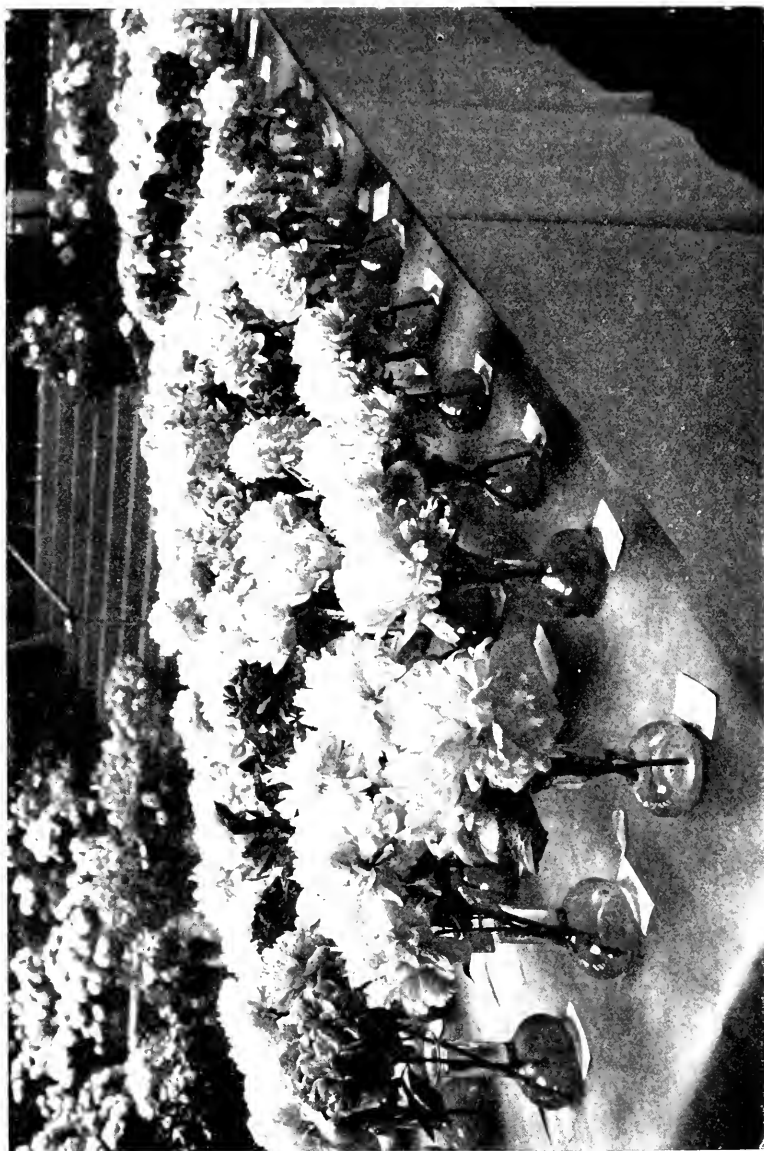


EXHIBIT OF SEEDLINGS
AT BOSTON, 1915
STAGED BY THE AUTHOR

grow seedlings should not be content merely to gather the seed we find ripening in the autumn; even though we gather only from a selected list of the finest kinds we should still not be satisfied; for we have everything to learn regarding the results of cross-fertilization of the varieties of the Chinese peony on each other. Few if any of our American growers have done any better than merely gather seed from good sorts. But we need a large number of hybridists, who will keep records of their crosses, from which we may in time learn to direct our efforts towards improvement with intelligence. There is a tendency among growers to think that bees are more intelligent hybridizers than men, and to speak with a kind of pride of the fact that whatever cross-fertilization takes place in their gardens, is done by bees. But the perfecting of the peony has now gone so far that it is unreasonable to expect to produce flowers of superior quality to the best we already have, by indiscriminate raising of seedlings. The only hope of success lies in a most careful selection of seed parents, or in cross-fertilization by hand. But of regulated intelligent effort to guide the development of the flower by hand-pollination there has been, so far as the record shows, very little, if any; though enthusiastic amateur and professional growers are at work in many parts of the country on the development of seedlings, and this also will come, in time.

To such ends then we should bend our efforts; setting two aims before us; the one being to raise the Chinese peony to an ever higher and higher plane of perfection, the other to create new types of peony bloom, calling to our aid other species, and by the keeping of exact records enable the workers who will come after us to carry forward what we have begun.

Clinton, New York.

Fern Culture

By J. F. Huss



THE somewhat limited facilities usually at the command of many growers in the house culture of Ferns necessarily limits the selection of varieties to those that are hardy enough to thrive under more or less congenial conditions; yet there will be found a sufficient number of these to gratify a healthy desire for variety.

To grow an assortment of Ferns and commence at the spore stage is truly a work of interest, and only thus can one get the complete joy of Fern culture. This requires evenness of temperature and exacting atmospheric conditions, but with a wardian case to germinate the spores and carry them through the early stages, the growing stages are comparatively simple. The spores can be started any time during the year, but during the early spring months is the best time, as the required temperature, 65 to 75 degrees, can then be readily maintained. Ordinary flower pots about four inches in diameter or pans up to six inches in diameter and two and one-half inches deep can be used.

The best material for sowing will be a mixture of sifted leaf mold peat, light soil and clean sand in equal proportions. While it is not absolutely necessary, it is desirable that this should be sterilized. This may be accomplished by steaming the soil or holding it over a good fire for a few minutes in a tray or shovel. In preparing the pot or pan for sowing it should be filled to within half an inch from the top, filling the bottom first with enough broken crockery or cinders to insure thorough drainage. This may be filled in until there will not be over one and one-half inches of the prepared soil on

the surface, but that will be quite sufficient for sowing the spores. When the pots are prepared for sowing they should be thoroughly watered an hour or two before sowing, giving the water time to find its way through the drainage system. The spores should be spread thinly on the surface and the pot must remain covered with glass until germination is well effected, and any watering can be done from beneath by simply standing each pot in a saucer of water and allowing the water to soak up through the soil. This permits watering without disturbing the germinating spores, and in a way, filters germs or any foreign vegetable matter that may be in the water. The glass covering must be cleaned of collecting moisture once or twice a day and can be gradually removed as the spores germinate, which will be in from ten to twenty-five days. When the prothallus stage is passed and young fronds commence to appear, the young plants should be transplanted into pans prepared as before, and given room to develop when they can be potted separately and grown into specimen plants.

In all potting operations the compost used should be of a porous nature. Small plants will require an equal mixture of leaf mold, sand and fibrous soil; large plants which will remain in the same pot for a considerable time will be benefited by the addition of well rotted manure in the soil, and when well established, an occasional light top dressing of "Clay's fertilizer" or fine ground "bone meal." Good drainage must be secured when potting, by placing pieces of broken pots in each pot, and when the plant is large, the addition of charcoal will insure perfect drainage, and the plants must be potted firmly but not packed.

In securing spores in variety for growing, it is well to go to a reputable seed house and get the best obtainable. If a general assortment is desired without strict regard to variety, a package of mixed spores will usually produce Ferns in such variety that a supply is assured not only for pot culture, but for planting mixed Fern pans adaptable for table decoration and jardiniere work.

Those who lack the time necessary in growing Ferns from spores will have good results by purchasing young Ferns, say two and one-half or three-inch pot size, and grow these on into larger specimens if suitable varieties are selected. They will grow splendidly during the summer in a cool, airy, well lighted room, if there is no coal or illuminating gas present, or in a shaded alcove or porch corner where the sun or wind will not reach them. Young plants will grow continuously, but older plants make somewhat periodic growths—from spring until early summer, and again during the autumn when the evenings are cool. By November the plants will have completed their growth and there should be no further effort made to have them add to it. Keep them in a temperature between 45 and 60 degrees during the winter months, water only when dry and then water thoroughly by standing the pot in a vessel of water, and on a bright, warm day the entire top may be immersed in water for a few minutes and the plant shaken slightly to remove surplus water. This discourages insects and keeps the plant clean and healthy.

If the plants are affected with insects—aphis, red spider or scale—some insecticide must be added to the water, any tobacco extract in mild proportion with soap will prove effective, but the plant should be plunged in or sprayed with clear water shortly afterward.

For general house culture the *Nephrolepis* family, which includes the "Boston Fern" and its various types, is perhaps the most favored. Among its beautifully crested forms are varieties *Piersoni*, *Whitmani*, *Amerpholi*, *Superbissima* and several others. Occasional fronds of the smooth type will occur among these and should be removed as they appear.

The "Boston Fern" (*Nephrolepis bostoniensis*) is undoubtedly the best of the smooth leaved type for house culture. The fronds are long and graceful and freely produced, and the plant is constitutionally strong. *N. Scotti* and *N. Giatrisi* are more compact forms of the above and make excellent specimens in small pots.

All of the *Nephrolepis* are best multiplied by potting up the young runners; dividing the old plants will seldom result in good specimens.

The "Maiden Hair Ferns" (*Adiantum*) are usually regarded as being too delicate for house culture, but there are several varieties that can be grown quite successfully. *A. Croweanum*, *A. cuneatum*, *A. hybridum*, *A. Lathomi*, and the new *A. Farleyense gloriosa* (Ruhn von Mordrecht) are all adapted to house culture. *Adiantum Farleyense*, the most beautiful of all



FERN BANK

Maiden Hairs, cannot be included among house plants. It requires a moist "Hot house" atmosphere, but its counterpart *gloriosa* can be expected to thrive under the conditions suitable to the hardier Maiden Hairs.

A number of the *Adiantums* can be grown from spores, but division of the old plants is the simplest method.

Other good house Ferns include *Cyrtomium falcatum* and *Cyrtomium Fortunei*. They like a cool atmosphere and can be raised from spores.

Lomaria gibba, a miniature tree Fern, is produced readily from spores and is of easy culture.

The *Pteris* Ferns are excellent for house culture. The small plants can be made up into Fern pans and large plants make handsome specimens. *Pteris Cretica albo-lineata* is one of our finest variegated Ferns. *Pteris serrulata* and its crested form *Pteris serrulata cristata* are well worthy of more extensive culture.

The "Asparagus Fern," although not at all related to any Fern species, is easily grown, and an excellent plant for the



GREENHOUSE FERNS

living room. The seed can be sown in spring and by fall the young plants, planted three or four to the pot or pan and with the addition of a few *Pteris* Ferns which can be removed as the *Asparagus* develops its growth, will make immediate specimen plants. *Asparagus Sprengeri*, also easily grown, is excellent as a pot plant or for planting in hanging baskets.

In conclusion, I might cite an instance that may illustrate what may be accomplished in the absence of facilities. A lady evidently possessing "that knack" with plants had been presented with three plants of *Adiantum hybridum* in three-inch pots and badly pot-bound. These were planted into an ordi-

nary box about 10 x 20 inches and 8 inches deep, and in June the fronds were entirely removed and the box placed in a cool shaded corner of the porch, and later to the living room where it was placed on a low stand. By October the growth was so vigorous that the objectionable box was entirely obscured by the overhanging fronds and the plant remained healthy and vigorous until cut back again in late spring for the succeeding season's growth.

Hartford

Landscape Gardening in its Relation to Roadside Planting

By O. C. Simonds



THE American Society of Landscape Architects defines Landscape Gardening as "the art of arranging land and landscape for use and enjoyment." Downing says "Landscape Gardening is an artistical combination of the beautiful in nature and art, the union of natural expression and harmonious cultivation. It is capable of affording us the highest and most intellectual enjoyment of any cares or pleasures belonging to the soil. The development of the beautiful is the end and aim of landscape gardening as it is of all other fine arts." In the development of landscape gardening in this country it was perhaps natural that attention should first have been given to home grounds and then to cemeteries and to public parks. The art probably reaches its greatest perfection in the creation of the larger examples of the latter to be found about our principal cities. It seems to me, however, that we have not as yet taken advantage of the wonderful opportunity we have in this country for the development of roadside beauty by means of planting. To develop a park within or near a city has often required the purchase of the land at a very large expense and then the development of this land at still further cost. Along the borders of our highways there are hundreds of thousands of acres now belonging to the public. This land is well adapted to the growth of trees, shrubs and herbaceous plants. To be sure the strip of ground



ENGLISH ROAD WITH OLD BEECH
TREES AND VARIED LOW GROWTH

available for planting is often narrow but sometimes even in cities it is ten or twelve feet wide and in the country where the highway is generally sixty-six feet wide and the roadway relatively narrow, the planting space on each side may amount to twenty feet or more. In some states provision is made in State laws for planting outside of the street boundaries if the owner of the adjoining property consents. Sometimes a road follows the border of a stream, the shore of a lake, the edge of a marsh or some other relatively open space, the conditions of which will naturally preserve it from encroachment for all time to come. Often a road crosses a ravine or a river, or it climbs a hillside, passes along the top of a ridge or the edge of a precipice and in all these places commands beautiful views which only need the framing of roadside planting to make them the most attractive of outdoor pictures. These strips of land lying usually on each side of the routes of travel possess not only the advantage of costing nothing since they now belong to the public, but they possess the further advantage of being placed just where the greatest number of people will see the attractive pictures that may be developed with them as a basis. What should be done with these strips of land to make them pleasing to passersby? To answer this question let us first take account of what has been done to utilize the opportunity offered. Usually planting has been confined to trees and these have generally been placed in rows. State laws regarding planting are based on the assumption that this will be the method universally followed. The State law of New York says that elm trees shall be planted not less than seventy-five feet apart, sugar maples fifty feet apart and gives similar rules for other trees considered appropriate for street planting. Mr. Wm. F. Fox in his *Tree Planting on Streets and Highways* enumerates some of the advantages of tree planting. He says,

“During the hot days of summer the streets which are shaded by trees are preferred to those which lack this protection. The temperature is much lower; and as the pavements are not exposed to the glare of the sun, there is less of reflected heat. The streets that are lined with shade trees



TROSSACHS, SCOTLAND
NOTE GROUND COVERING OF FERNS, AND THE MYSTERY OF THE WOODS

are more attractive to the eye; and their superiority is readily apparent when compared with those on which there are no trees. The shaded streets being cooler they are more desirable for residences, and other things being equal, property is more valuable and commands higher rents. The air is purer by reason of the foliage, which inhales carbonic acid and exhales oxygen. The leaves absorb the poisonous gases generated in hot weather by the decomposition of animal and vegetable matter, and thus an active source of disease is eliminated. During hot summer days the diseases incidental to that season are not so prevalent in streets and localities which are protected from the heat of the sun by overhanging trees. At a meeting of the New York Medical Society a resolution was passed in which the opinion was expressed that "one of the most effective means for mitigating the intense heat of the summer months, and diminishing the death rate among children, is the cultivation of an adequate number of trees in the streets."

There are many miles of roadside in our cities, villages and along country highways which have been planted with trees giving all the advantages enumerated by Mr. Fox. The existing examples of what has been done show what we might have where trees do not now exist. Lessons can also be learned from the neglected roadsides where trees and other growth are accidental, the seeds having been distributed by the wind or planted by birds and small animals. But the miles of roadside growth form but a small fraction of the total length of highway in this country and the opportunities offered by the naked roadside and the methods of treatment are the subjects that I would call attention to in this paper.

In the more thickly settled portions of that part of the United States which was once covered with a continuous forest the native growth has in many instances been cut away until the land now presents the appearance of a prairie broken only by fences, buildings and perhaps a few trees about the houses. In the region extending from New England westward to the prairie states along the latitude of southern Michigan, there were formerly found in almost every locality trees and shrubs in great variety. These included beeches, sycamores, black cherries, walnuts, butternuts, wild crab apples, lindens, red-



AN ENGLISH ROAD

buds, hornbeams, tulip trees, sassafras and two or more species of each of the following,—oaks, elms, maples, hickories, thorn apples and ash. There were also shrubs and wild flowers in great profusion. It would have been delightful if some of the native growth could have been preserved, but unfortunately it has generally been destroyed. The vacant land, however, affords opportunity for planting and for securing most charming effects and giving to our country an aspect more beautiful than is found in any other.

What I would first question in suggesting the treatment for vacant roadsides is the use of trees in straight lines with uniform spacing. Doubtless each one of us can recall most charming woodland and country roads along the borders of which Nature has done the planting. In these roadsides trees do not grow in rows. A group of two or three may stand close together; then there may be a long space, a single tree, another space and a group of half a dozen and so on. The growth, moreover, is not confined to trees, but there will be viburnums, hazels, wild roses and other attractive shrubs as well as asters, goldenrods, wild violets and other flowers, so that we get what Downing calls an "artistical combination." Why should we not seek to have such combinations along village streets and along all of our country roads? One of the most beautiful streets I know has along its border a growth of native trees, mostly our oaks, arranged as Nature planted them. I have heard people regret that these trees were not in straight lines and uniformly placed, but, to my mind, they are far more attractive placed just as they have grown. They have a varied sky-line. A tree standing slightly farther out than the others catches the light; the irregularity of arrangement gives deeper shadows. The lack of uniformity adds to our interest in the growth. Three trees of varying size in a group have a greater charm than three trees exactly alike. The prevalent notion with regard to street planting is sometimes shown by trees placed at regular intervals along the border of a natural wood, thus creating an inharmonious combination. Fine old "monarchs of the forest" are even cut away to make room for

rows of elms, maples or lindens. In a city noted throughout the United States for its beauty a landscape architect advised cutting down the elms and other trees that had been growing from fifty to one hundred years along its streets, because they were not uniform. They were not even always in straight rows and were not placed at the proper distance from each other. In another city, likewise noted for its beauty, there came a man who said he was an expert tree trimmer and because he said this the city council engaged him to trim the street trees, mostly sugar maples. The Regents of the University located in this town also engaged him to trim the trees of the campus. This expert tree trimmer at once proceeded to cut off the tops of the street trees and many of the trees in the campus and of the trees in the city park, his theory being that no tree should be over thirty-five feet high. Needless to say, the beauty of the streets was destroyed and many of the maples afterwards died because decay set in where trunks and large branches had been cut. These instances to my mind indicate an utter blindness to natural beauty on the part of the expert advisers.

I should like to make a plea for naturalness. It would be a pleasure to see every mile of roadside throughout our states, which were originally wooded, show specimens and groups of the kinds of trees once found growing in its region. Each tree and shrub has an especial beauty of its own. It would be worth while planting all the trees and shrubs named and many others for the sake of the particular beauty of each, but when we think of these in relation to each other the artistic combinations have even greater importance.

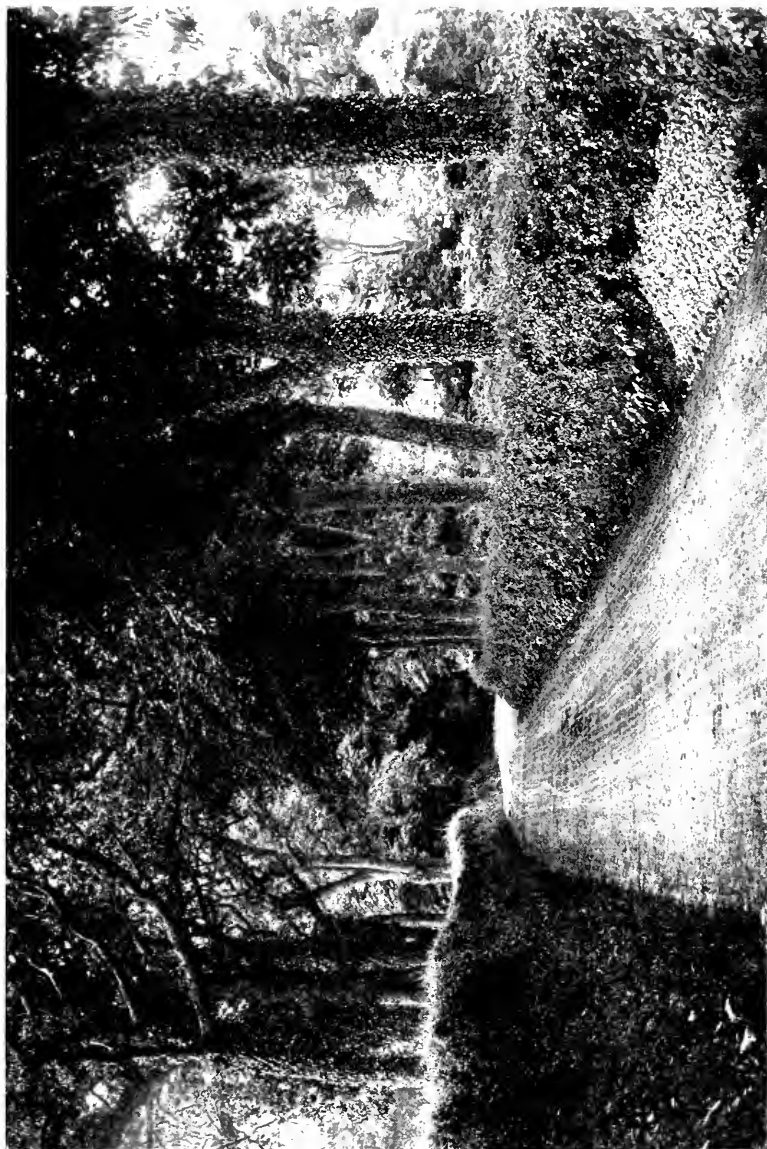
Let us think of a drive as we might imagine it. We start from some point in a city or village and go out into the country. As we look forward from our starting point we have the effect of a shaded street. The first trees on either side frame in those beyond, the trunks of the trees being in groups making pleasing combinations. An unusually wide opening at the left shows over a border growth of shrubs the home grounds of one of the larger property owners. The shrubs give privacy

to these home grounds but over them at a little distance we see redbuds and Juneberries in bloom. Farther on is a sugar maple filled with yellow flowers hanging on slender threads. The opening with the objects seen through it makes an interesting picture. We get a glimpse but do not see the whole of the home grounds. The fact, however, that they are partly hidden makes them more interesting by exciting our curiosity or imagination. At the right of the highway there is continuous growth, sometimes trees, sometimes shrubs, but by the sunshine coming through we note an opening on ahead and wonder what we shall see upon reaching it.

Thus with one picture after another we are led on until we reach the country. Here the ground is rolling. Just before coming to a valley leading off to the right there is an immense black walnut, its branches reaching quite across the drive. The grade of the road has been raised where it crosses this valley and the sloping sides of the fill are covered with elderberries, prairie roses, hazel bushes, aromatic sumac, sassafras and Virginia creepers. These are arranged usually in masses so distributed as not to interfere with each other. The prairie roses and elderberries, however, are more or less interspersed in one group, which will be covered with white and pink flowers the latter part of June. On the left the valley narrows to an attractive ravine. This was of little practical use to the farmer and he generously gave it to the highway commission to permanently add to the attractiveness of the border and to the pleasure of travelers. Just beyond the valley the road enters a shallow cut. At the right the hillside is covered with a growth of sassafras, above which there is a grove of tulip trees. On the left there is a bit of natural woods made up mainly of oaks with an undergrowth of hazels. As we reach the top of the hill after going up an easy grade we look forward perhaps a third of a mile along a drive shaded by trees but bordered also with a tangled growth on each side. We can get a glimpse of a still higher hill on ahead but the road avoids this by turning to one side. This hill, which is rather steep, is covered with forest. On the lower side, however, there is only a low

growth, the trees having been cut away to show an extensive view of the country. We follow the curved road around the hill pausing however to look at the distant fields and clouds. Then, as we proceed, we note a river which drains a broad valley. The road we follow gradually descends after passing the hill and then curves around to an interesting bridge which we can see in the distance over intervening farms. Wherever there are attractive views wide spaces are left in the roadside planting, but in other places there is often a perfect tangle of growth, with locations where birds would like to nest. On reaching the bridge we naturally stop to look up and down the river. The township has acquired the borders of this stream to preserve them for all time for the general public. As we look up and down we can see elms, lindens, sycamores, hackberries and other trees either leaning over the water or sending out far-reaching branches. A great elm nearly four feet in diameter has protected the bank with its far-reaching roots. Farther on, one of the sycamores mentioned serves the same purpose. Passing the river we enter a piece of woods where the growth is so thick as to hem us in on either side. We pass through a tunnel of foliage, most interesting in its varied growth. There are tree trunks and branches of many shapes, sizes and colors, native shrubs just coming into bloom and a ground-covering of wild flowers. We catch glimpses of the woolly heads of unrolling fern fronds. A low place by the side of the road is covered with hundreds of marsh marigolds. We drive on through the woods and come again to an open country where the road is bordered by large spreading elms with very little undergrowth. This imaginary road gives merely a hint of what we might have to look at whenever we take rides or walks along public highways. I say just a hint because it is impossible to convey by words an idea of the beauty of all the fresh spring growth and the wonderful variety of graceful shapes which might be seen everywhere and which we do find occasionally.

We make some attempt to preserve historical places,—a battlefield, the home of a great man, Indian mounds, rare



AN ENGLISH LANE



WILDWOOD DRIVE
CHICAGO

natural objects like Niagara Falls. I wish we could preserve for future generations some of the attractive woods with which the country was entirely covered when white people came and it certainly would be pleasing and instructive to have narrow strips of woods along the borders of our country drives. I should like to have all our wild flowers preserved in these woods. I know some objections may be raised to the scheme I have outlined. Some will say that shade will make the road muddy. The automobiles have made a road with a hard surface almost a necessity and a good road suitable for such traffic will be benefited rather than injured by shade. Others will say that thickets will harbor weeds and insects. Farmers will claim that a growth of trees injures the crops along the borders of their farm. This is true, but the checking of the winds will make the crops better in the center of the field and more than offset the loss at the edge. Sometimes a thick growth along the side of a field will prevent a crop from being ruined.

An objection has frequently been made to shrubs because they may hide approaching automobiles and thus introduce an element of danger. Care should be taken to avoid this. Where a road is straight undergrowth at the side will not hide an approaching vehicle. Where a road is curved there is always one side upon which objects might have any height or density without obscuring one's view of the road he is approaching. Upon the opposite side a ground-cover of vines, wild roses, lupines, yellowroot, trailing junipers, mosses or any other growth not over two or three feet in height would make an interesting object and be entirely harmless.

The roadsides should of course receive a little care. The Canada thistles, wild carrots and wild lettuce should not be allowed to grow, but these noxious weeds are more apt to grow in the open than underneath trees. The birds that would be delighted to build nests and live in the trees and shrubs would more than take care of the injurious insects. It would be necessary at times to remove dead trees and dead branches, but the wood might repay for the work. Possibly other objections might be raised, but would not the pleasure far outweigh



A WOODLAND DRIVE, A NARROW
ROADWAY. SKYLINES AND BORDERS WOULD
BE JUST AS INTERESTING FOR A WIDER ROAD

the cost and trouble? An open naked road costs something. Weeds are apt to grow along its borders and it is often dusty. A road bordered with rows of trees is much better. It may be attractively shaded but it is apt to be monotonous. A roadside treated as I have outlined might be an arboretum, a place wonderfully interesting because of its varied beauty and a place also where one could learn every tree, shrub and flower.

Chicago.



CATTEYA MOSSIAE
SPECIMEN PLANT

Orchid Breeding

By David Lumsden



PWARDS of seventy years have elapsed since the Honorable and Very Reverend William Herbert, LL.D., Dean of Manchester, delivered a scientific and immensely interesting paper entitled "Hybridization among Vegetables," before the members of the Horticultural Society of London. This paper was founded on scientific investigations conducted by himself in his garden and greenhouses at Manchester. It was the subject of much criticism mainly because it was too advanced for that time. The paper, nevertheless, contained a wealth of valuable information which has opened many channels for scientific research in things pertaining to plant breeding, including plants belonging to the natural order Orchidaceae. Quoting from Dr. Herbert's valuable paper:

Cross breeding among orchidaceous plants would perhaps lead to very startling results; but, unfortunately, they are not easily raised by seed. I have, however, raised *Bletia*, *Cattleya*, *Orchis*, (*Herminium*) *monorchis* and *Ophrys aranifera* from seed; and if I were not during the greater part of the year absent from the place where my plants are deposited, I think I could succeed in obtaining crosses in that order. I had well-formed pods last spring of *Orchis* by pollen of *Ophrys*, as well as other species of *Orchis*, which had been forced; and if I had remained on the spot, I think I should have obtained some cross-bred orchidaceous seed. An intelligent gardener may do much for science by attempts of this kind, if he keeps accurate notes of what he attempts, and does not jump at immature conclusions.

This, apparently, is the first information on record relating to the cross-fertilization and raising of orchids from seeds.

After an interval of ten years, John Dominy, foreman in the nursery of James Veitch & Son at Exeter, caused no little excitement among botanists and gardeners by exhibiting in flower perhaps the first orchid to be raised by artificial cross-fertilization. Credit must be given Dr. John Harris, of Exeter, a surgeon and amateur botanist, as he first suggested to Dominy the possibility of obtaining hybrid orchids, and explained to him the reproductive organs of the flowers and the process of



SEEDLING CATTLEYA
SIX MONTHS OLD

their pollination. The plant referred to was *Calanthe* \times *Dominii* being the results of crossing *Calanthe masuca* with *C. furcata*. This cross was considered a great cultural feat by the gardeners of that day. Botanists were somewhat unkind in welcoming this new plant, and the eminent Dr. Lindley, perhaps the leading botanist and systematist of his time, when shown the plant exclaimed: "You will drive the botanists mad!" This explained the feelings in general of many scientists regarding hybrid plants or "mules," as they were termed in the earlier days.

Dominy raised many crosses, prominent among them being *Calanthe* × *Veitchii*, *C. rosea* × *C. vesteta*; *Laelio-cattleya exoniensis*, *Laelia crispa* × *C. mossiae*; *Phaio-calanthe irrorata*, *Phaius grandiflorus* × *Calanthe vesteta*; *Paphiopedilum* × *vexillarium*, *P. barbatum* × *P. Fairieanum*; *Cattleya* × *Dominiana*, *C. labiata* × *C. intermedia*; *Phragmopedilum* × *Dominianum*, *P. caricinum* × *P. caudatum*; *Paphiopedilum* × *Harrisianum*, *P. villosum* × *P. barbatum*. It is remarkable that several of these crosses raised upwards of fifty years ago, having been propagated by the asexual method, still retain their original vitality, although oftentimes subjected to rather adverse environmental conditions. John Seden followed Dominy in the work of hybridization, and the numerous crosses made by him are well known to all orchid lovers. His successes included not alone bi-generic and tri-generic, but also multi-generic hybrids. From this time on, many interested orchidists, both private and commercial, took the field, prominent among them being the firm of Sander & Sons, St. Albans, England. The work accomplished by them in the raising of seedlings has assumed such proportions that throughout the world where orchids are known the name Sander has become a household word.

As a problem in research work, the writer took up the study of Mendelism in orchids and is attempting to ascertain how orchids Mendelize in the following characters:

- (a) Blended inheritance.
- (b) Mosaic inheritance.
- (c) Alternative inheritance.

Observation is also being recorded in reference to pollination:

- (a) Will self-pollination of species produce true characters in offspring?
- (b) Will close pollination produce degeneration?

From the foregoing problem it will be seen that many crosses between species and hybrid species were required to be made; therefore methods of seed germination had to be studied. Quoting from a paper on "The Hybridization of Orchids" by Mr. H. J. Veitch, read at the Orchid conference held at South Kensington, London, during the year 1885:

Capsules were produced in abundance which in due course proved their maturity by dehiscing and thus the long and anxiously-desired seed was at length at hand. Then arose a great difficulty, a difficulty which still exists, and which our long experience has enabled us to make only a short step towards overcoming to discover the most suitable method of raising seed.*

But as it was in the early days of orchid hybridization, so it is now. We seem as far off as ever from hitting upon a method by which at least a moderate amount of success may be calculated upon. Failures were at first, as now innumerable, and numberless such are without doubt inevitable.

A clue to the mystery, if so we may term it, in reference to the raising of orchids from seed, was furnished by Noel Bernard in 1903. He found that when the seeds were sown under aseptic conditions the embryos swelled and formed green spherules and finally died; when sown on pure cultures of the endophytic fungus isolated from the roots of those plants, the embryo developed normally, forming a spheroid body which soon produced a cotyledon and papillae with long root hairs.

Further investigation by Bernard and Burgeff showed that the germination of orchid seed does not occur except in the presence of the root fungi.

The writer having studied the methods pursued by Bernard and Burgeff carried out numerous germinating experiments, first, by sowing seeds under purely aseptic conditions, using cellulose, starches, agar and other nutrients as mediums on which to sow the seed. Not in a single instance did growth manifest itself beyond a swelling of the testa. The seeds showed no signs of developing to the point of taking on chlorophyll. Numerous experiments have been tried with

* Seed we get in profusion, but so little of it germinates that the patience of the most persevering is put to a severe test. The seeds of hundreds of capsules have been sown without yielding a single result. In very many cases only a solitary plant had been raised from a capsule that must have contained thousands of seeds; in very few instances indeed has the number of seedlings from one cross reached a hundred. It is true that we have raised many seedlings in the aggregate, but many of them have appeared when least expected; and when we consider the myriads of seeds that have been sown and the comparatively few plants raised, we cannot be said to have achieved a very great success.

sowing seed on woods of various kinds kept under normal and abnormal moisture conditions, but results with these were *nil*.

Satisfactory and encouraging results have been obtainable when seeds have been sown in 5-inch flower pots where a compost consisting of equal parts of peat and sphagnum moss have been used with a covering of fine-woven, clean burlap stretched tightly on top of the compost. Before sowing the seeds the pots containing the compost are placed in the steam sterilizer and subjected to a pressure of 25 pounds of steam to a square inch for 30 minutes, and this is repeated a second day. After the flower pots have been removed from the sterilizer the covering of burlap is raised and small sections of orchid roots cut from a growing allied genus are placed directly on top of the compost, after which the burlap is replaced. The flower pots are then removed to the propagation frame. If no fungus appears on the surface of the pots after a period of from twenty-four to forty-eight hours has elapsed, the seeds are sown. The seeds are scattered evenly over the surface of the burlap. Average moisture conditions are maintained by placing saucers of water in the bottom of the frame, and an eighty to eighty-five per cent degree of humidity maintained.

It is true that the writer has had scattering seedlings appear on check pots which have not been sterilized. This may be due to contamination as the check pots were placed side by side with those containing the fungus in the germinating case. However, in no case have the results been encouraging where the fungus has not been introduced directly to the pots or media. This leads the writer to believe that immediately after germination has taken place, development of the plant can not proceed unless in the presence of a mycorrhizal root fungus.

In order to dispel any theory of the possibility of the fungus having its genesis in the seed, a capsule containing seeds of a cross *C. mossiae* × *C. intermedia* was taken from the plant previous to its dehiscing, the seeds were extracted and sown under purely aseptic conditions on the culture medium. A number of sowings were made, but in not a single instance was any contamination noticeable.



FLOWER POT CONTAINING SEEDLINGS
WARSCWEIZII N. C. DOWIANA VAR. AUREA GROWN ON INFECTED MEDIA
NOTE: UPWARDS OF 300 PLANTS IN THE FLOWER POT

The work now being undertaken is to endeavor to obtain pure cultures of the symbiotic fungi in orchid roots. In this work the writer has had the coöperation of Mr. H. Lebowsky, and the *modus operandi* is as follows:

1. The glass ware used is thoroughly washed in soap and water, then immersed for a few minutes in chromic acid cleansing solution and afterwards rinsed in tap and distilled water. The apparatus is allowed to dry in the air. Test tubes and flasks are sterilized in the steam autoclav under fifteen pounds pressure for thirteen minutes. Petri dishes, water dishes, needles, etc., are wrapped in paper and subjected to 150°C. for two hours in the hot air sterilizer.

2. The culture medium, which thus far has been very satisfactory, is made up as follows:

	<i>grams</i>
MgSO ₄2
K ₂ HPO ₄5
FeCl ₃	Trace
KNO ₃1
NH ₄ Cl1
NaCl1
Corn starch	5-10
Agar20
Distilled water	1000 cc.

3. This solution at a temperature of 45° to 50°C. can be readily poured in 10 cc. volumes into the required number of test tubes. These are plugged and sterilized in the autoclav at fifteen pounds pressure for thirty minutes. The solutions are then transferred from the test tubes to sterile Petri dishes in which the Agar solidifies. Two or three days are allowed to expire before any attempt at inoculation is made. This is done to be reasonably sure of sterile media.

4. Roots growing in the air, also roots from potted plants are utilized in making inoculations. The roots are first washed thoroughly to remove any dirt particles and other foreign materials. They are cut into one and one-half inch lengths, and the external surfaces sterilized by immersion for one-half to three minutes in a seven per cent solution of calcium hypochlorite.

All inoculations are made in a small closet-like room constructed especially for that purpose. A fine water spray, when vigorously applied, serves to cleanse the air in the room of any floating material. The table on which the work is done is sterilized by a plentiful application of bichloride of mercury, 1-1000. The hands and arms are similarly sterilized. Instru-



SEEDLINGS FROM *CATTLEYA MOSSIAE* CLOSE POLLINATED
REPRESENTATIVE GROUP. PLANTS HEALTHY AND VERY VIGOROUS
ONE YEAR OLD

ments such as scalpel, forceps and needle are flamed after each operation. Every possible precaution is taken to isolate the true mycorrhizal fungus. Small pieces of the orchid root, about one-eighth inch long, are cut off and transferred to the Petri dishes containing the nutrient agar. The cultures are grown in the dark under average humidity at a constant temperature of 25°C.



FLOWER POT MADE READY TO RECEIVE THE SEEDS

Out of a series of about one hundred cultures, only two organisms have occurred with any noticeable regularity. There has been some contamination. It is a little early as yet to claim any measure of success for the methods pursued.

Symbiosis opens up a wide field for investigational work and the writer who is conducting several investigations with Ericaceous and allied plants is firm in his belief that many of the angiosperms are, in a large measure, if not wholly, dependent or rather have become parasitic on a symbiotic mycorrhizal fungus.

It is the firm belief of the writer that orchidaceous plants have become, as it were, specialized on various root fungi. Experience with a very large number of crosses of the Tribe Vandeae, Cypripedieae and Epidendreae are definitely showing that a separate organism is required for each tribe and perhaps in some cases, genus, and even in very specialized cases, species.

Work is still in progress along this line and the more definite conclusions that are now being recorded will be presented in an article at a later date, illustrated with photo-micrographs showing the relation between the orchid seed and the fungus, which is one perhaps of mutual parasitism rather than one of mutual symbiosis.

Cornell University,
Ithaca.

War Work of the International Garden Club

Des Lis, des bleuets, des coquelicots,
C'est comme au drapeau qui couvre la plaine
Etait-ce en Alsace, était-ce en Lorraine
C'était en Pays Ami sûrement.



IN MARCH, 1918, the International Garden Club decided to offer its club house and grounds for an open air and convalescent hospital for our returning wounded, to be run in coöperation with the Red Cross Society, the Fordham Hospital and the New Hospital built by Columbia University which has been taken over by the Federal Government. Letters to this effect were sent to Miss Leverich, chairman of the Bronx Chapter of the Red Cross and to Mr. Harvey D. Gibson, General Manager in Washington.

In the meantime the Garden Club in coöperation with the Mayor's Committee of women on National Defence for the Bronx wished to make use of the meadowland for the pasturing of cows. It was planned to erect cow shelters on the grounds and to run two motor trucks every day to the congested district on the Upper East Side of New York where stations are being formed where milk can be sold at a reasonable cost to the poorer people for the duration of the War. It was hoped other vacant lands suitable for pastures would be made use of in the Bronx, and cows maintained near New York to avoid the cost of transportation.

Circulars were sent out asking for two motor trucks at \$900.00 each and for contributions for the purchase of cows



THE OLD MANSION ON THE HISTORIC HAMILTON ESTATE
LEASED BY THE INTERNATIONAL GARDEN CLUB
FOR ITS WAR WORK



COWS GRAZING IN THE PASTURE AT "NEVIS"
THE CLUB'S DAIRY IS ON THIS BEAUTIFUL
OLD HAMILTON COUNTRY SEAT

and towards the cost of labor for maintaining them. Gifts should be sent to the Treasurer of the Garden Club, Mr. Thomas Baskerville, care of the Liberty National Bank, 120 Broadway, New York.

Mr. Edward Burnett, the eminent dairy expert, was invited to coöperate and inaugurate the work. Owing to the expense and lack of time it was found impracticable to construct cow stables at Bartow, and it was decided to lease a private place with an already established dairy. Mr. Burnett was directed to purchase the cows, and has been able to obtain some very fine specimens.

The War Committee of the Garden Club has been most fortunate in obtaining the beautiful old Hamilton place "Nevis" at Irvington on the Hudson, with an up-to-date dairy just built. At the time of writing the work is in full operation, and we are receiving most touching testimony from the settlement and clinic to which the milk is being sent, and from there distributed, of the appreciation of "real country milk." One little child, hardly more than an infant, in one of the crowded East Side tenement districts, the nurse reports, will not now touch the other milk; and at the clinic they have begged us to allow them to use it for their very sick patients as well as for the mothers and children. The work must be maintained now that it is established, and contributions will be welcomed by the treasurer.

A Dairy Tea to which the members will be invited to see the Dairy for themselves, and these charming pastures which have been found near New York, will be held at beautiful "Nevis" early in September.

On April 25, the President of the Garden Club received the following letter from the Red Cross at Washington:

National Officers

WOODROW WILSON,
President
ROBERT W. DE FOREST,
Vice-President
JOHN SKELTON WILLIAMS,
Treasurer
JOHN W. DAVIS,
Counselor
STOCKTON AXSON,
Secretary

WILLIAM HOWARD TAFT,
Chairman Central Com.
ELIOT WADSWORTH,
Vice-Chairman
HARVEY D. GIBSON,
General Manager

THE AMERICAN RED CROSS

Washington, D. C.

Red Cross War Council

HENRY P. DAVISON,
Chairman
JOHN D. RYAN
CORNELIUS N. BLISS, JR.
HARVEY D. GIBSON
GEORGE B. CASE

Ex Officio

WILLIAM HOWARD TAFT
ELIOT WADSWORTH

APRIL 24, 1918

Mrs. Charles Frederick Hoffman.
15 East 84th Street,
New York, New York.

MY DEAR MRS. HOFFMAN:

Replying to your letter of April 22, to Mr. Harvey D. Gibson, offering the Bartow Mansion to be used by the Red Cross as a convalescent home, I sincerely regret that we cannot, at this time, give you a definite acceptance of your very generous and patriotic offer, but the Red Cross is not in a position to state as to just how much of this work, in the care of convalescents, will be delegated to them. The present attitude of the War Department is that they expect to treat most of the wounded in France, until it is positively determined that they will not be able to return as individuals to their organizations at the front. Those who can never go back as soldiers will be returned to the United States where they will be treated in military hospitals, under the direct supervision of the Surgeon General's Office until such time as they may be discharged from the Military Service.

You will perceive that this rather narrows the field for treatment of wounded soldiers in this country and until a large number of wounded are returned it will be difficult to state just how much necessity there will be for the use of convalescent homes. We have on file in this office a large number of offers of the same nature as yours and are ready to extend any assistance to the War Department that they may set fit to request. We will be very glad to file this offer so as to be in a position to utilize it, should the occasion arise, but do not allow this to interfere with any other plans that you may have with reference to the place, as you will receive plenty of notice, if the Red Cross finds that it can make use of your offer and you will not be inconvenienced in any way.



ENTRANCE TO "NEVIS"
(1835)

Assuring you of the sincere appreciation of the American Red Cross, I remain

Very truly yours.

[SIGNED] C. H. CONNOR,
Lieutenant-Colonel, Medical Corps, U. S. Army,
Assistant Director General of Military Relief

This letter was read at the spring meeting of the Club and it was the consensus of opinion that Bartow had a usefulness during the war, in its own capacity, quite as great as if accepted by the Red Cross. So many of its members whose men are abroad, having great use for it during the summer months, as well as those engaged in patriotic work who do not expect to leave town.

The following documents are also reproduced, indicating the cooperation of the Mayor's Committee of Women on National Defense.

MAYOR'S COMMITTEE OF WOMEN
ON NATIONAL DEFENSE

HEADQUARTERS
FOR THE
BOROUGH OF THE BRONX
MUNICIPAL BUILDING
177TH STREET AND THIRD AVENUE
NEW YORK CITY

DEAR SIR OR MADAM:

The most serious question of the moment is the need of cheap milk in the crowded tenement district on the East Side. There has been much suffering this winter. The price of milk has become prohibitive owing to War conditions, and as a War measure, the Mayor's Committee of Women on National Defense for the Bronx is arranging to pasture several hundred cows on the available meadow-land through the Bronx. Motor trucks will carry the milk daily to stations on the Upper East Side, where it can be sold at a reasonable rate to these people of the crowded tenement section.

The saving of our infant population and the maintaining in health of our little children is as necessary a War measure as the care of our wounded, and for this purpose a supply of good, cheap milk is an absolute necessity.

Several motor trucks will be needed at \$900.00 each to carry the milk every day to the stations, and gifts of these and contributions are asked towards the purchase of cows and for the labor to maintain them during the duration of the War.

Kindly make cheques payable to Mrs. Charles Frederick Hoffman, Chairman, and send to the Columbia Trust Company, 34th Street and Fifth Avenue, New York City.

[SIGNED] ZELIA K. HOFFMAN,
*Acting Chairman of the Mayor's Committee for
the Bronx and 18th to 35th Districts of
Manhattan, City of New York*

MAYOR'S COMMITTEE OF WOMEN ON NATIONAL DEFENSE

Since the first circular was printed, Mrs. Hoffman has been appointed full Chairman for the Borough of the Bronx and the Upper East Side of Manhattan.

With the assistance of Dr. Ralph W. Lobenstine, Chairman of the New Maternity Centre Association, coöperating with the New York Milk Committee, and under the advice of Dr. Edwin Cragin, Dr. J. Clifton Edgar, Dr. Austin Flint and Dr. Josephine Baker of the Department of Health, a study has been made of this upper Manhattan district, where the population is dense and the percentage of mortality is 97.5. There are few hospitals in this region, with the consequence that the expectant mother has to go a long distance to reach the care she needs, and she is usually a wage earner and too busy to seek it out. Statistics show that 70 per cent of them go without treatment, and this causes much unnecessary loss of life. The great need is not only for milk, but to see that it is properly distributed at a time when its use means life or death to the mother and child.

In the Bronx there is an immense infant population, and according to the latest medical experts no Centres whatsoever. The Committee of which Mrs. Hoffman is Chairman proposes to establish a maternity Centre on this Upper East Side in Manhattan and also at least one in the Bronx directly under the supervision of the Maternity Centre Association, which will provide the physicians and nurses for these centres. They will see to the distribution of the milk and will keep the records and compile the statistics for the year, so that those contributing to this work can go to these centres and see the results of their generosity in the records.

The following contributions are needed to carry the work through.

Contributions of \$100 towards the payment for two Maternity Centres—\$1200 (Rental). One in upper East Side of Manhattan; one in the Bronx.

Contributions of \$50 towards wages and maintenance, as a fund of \$5,000 should be in hand for the year.

The International Garden Club has undertaken as its War Work to run the dairy under the supervision of the Medical Board and the expert advice of Mr. Edward Burnett. The pasturing of cows in the Bronx has been given up as it was found too expensive to erect shelters for the cows at this time. Only a small dairy will be maintained, sufficient to supply the two Maternity Centres undertaken, so that definite statistics can be tabulated for a given area.

New York City is being zoned under the Maternity Service Association and the zone undertaken by us will be Zone No. 8.

The following is an excerpt from the Constitution of the Maternity Service Association:

“ARTICLE III. The membership of the Association shall consist of one representative from the obstetric staff of each hospital having a maternity service in the City of New York caring for one hundred to two thousand cases a year; two members from any hospital caring for more than two thousand cases a year; one representative from each of the three City Departments concerned with maternity service, namely, Department of Charities, Bellevue and Allied Hospitals, and the Department of Health; one medical representative each from such lay organizations as have objects similar to those of M. S. A., providing that such hospital or City Department or lay organization shall accept and agree to observe the principles set down in the Constitution.”



ONE OF THE BEAUTIFUL VISTAS OF THE HUDSON AT "NEVIS"
LEASED BY THE INTERNATIONAL GARDEN CLUB
FOR ITS WAR WORK

MEMBERS OF THE EXECUTIVE BOARD

DR. RALPH W. LOBENSTINE
 DR. J. CLIFTON EDGAR
 DR. I. L. HILL

DR. EDWIN CRAGIN
 DR. FRANKLYN A. DORMAN
 DR. H. McM. PAINTER

DR. NATHAN RATNOFF

MEMBERS OF THE MILK COMMITTEE FOR WAR WORK

MRS. CHARLES FREDERICK HOFFMAN, Chairman

MRS. JOHN E. ALEXANDRE
 DR. NICHOLAS MURRAY BUTLER, ex-officio
 DR. HENRY D. CHAPIN
 MRS. FREDERICK R. COUDERT
 MR. STUART DUNCAN
 DR. AUSTIN FLINT
 MRS. LEWIS GAWTRY
 MRS. LAWRENCE L. GILLESPIE

MRS. HERBERT HARDE
 MISS ELIZABETH KEAN
 MR. ADOLPH LEWISOHN
 DR. GEORGE NORTON MILLER, ex-officio
 MRS. LEWIS GOUVERNEUR MORRIS
 MISS FRANCES PERKINS
 MRS. ERNEST M. STIRES
 MRS. MARSHAL ORME WILSON

MRS. J. J. WYSONG

The Plane Tree

By Martha Prentice Strong, I. G. C.

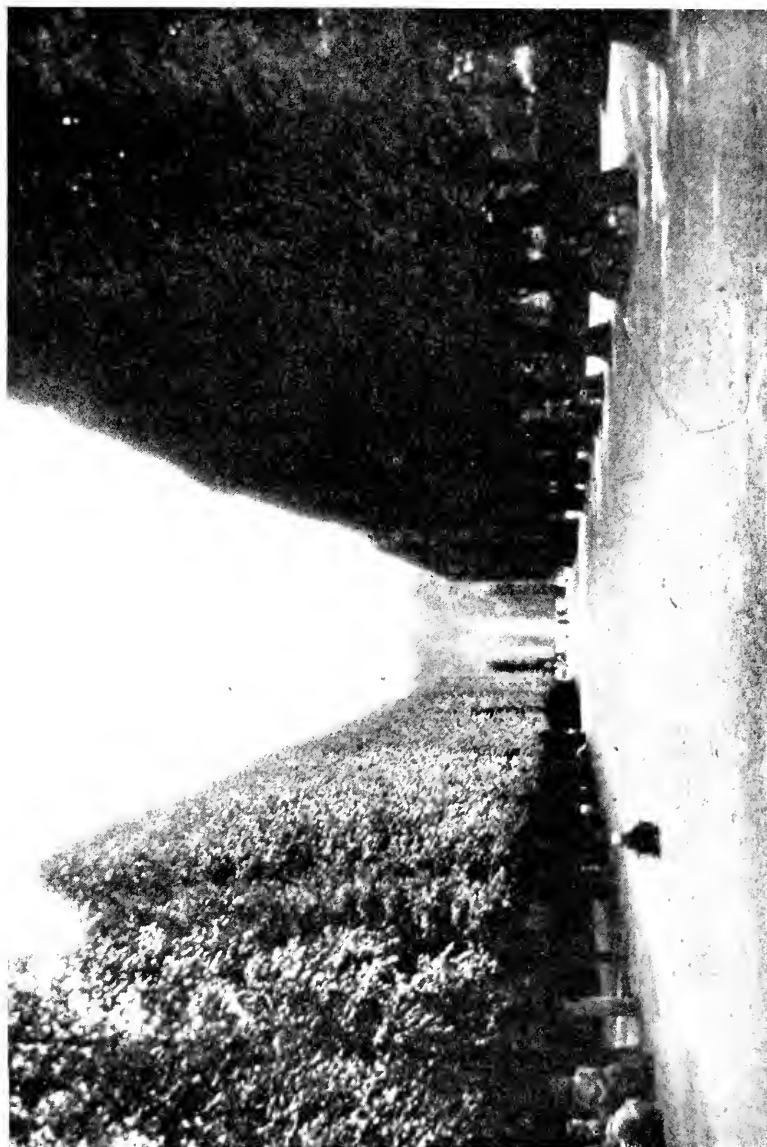
With photographs by the author



THE days before the fateful year of 1914, spent in pleasure trips in Europe, seem almost fanciful and dreamlike. Only a vivid impression received during those days of leisurely travel, could now bring before me the phases of nature, that interested me.

I recall a warm morning in Geneva in 1903, when seated under a beautiful spreading Plane tree, we watched the life on the lake; the faint shimmering green, and deep blue tints of the water; and the English gardens on the opposite bank. Crowning all this beauty were the white peaks of Mt. Blanc shining in the brilliant sunlight. There began my interest in the Plane tree. The promenades around the lake were shaded by rows of these trimmed trees as far as the eye could reach, giving perfect shade, the branches, high enough from the ground for distant vistas, and the crowns of the trees so low, as not to interfere with the views from the surrounding hotels, of the exquisite scenery of lake and mountain.

The London Plane (*Platanus acerifolia*) now so extensively planted here and in Europe, is thought to be a hybrid of our native Sycamore ((Button-ball; Button-wood) and the Oriental Plane (*Platanus orientalis*). It was under the spreading branches of the Oriental species that the Persian fire worshippers camped, when holding their religious rites, and the tree was sacred to them as the Oak was to the Druids. Only four specimens of our native sycamore (*Platanus occidentalis*) are now known to be in the western part of Europe. In Worthington, Indiana, is one, the trunk of which is 42 feet 3 inches in circumference, and 150 feet high. As there has been much discussion



AN ALLEE OF SCHÖNBRUNN-PALACE-PARK
VIENNA, JULY, 1913

lately as to the species of trees here and in Europe, I shall consider only the tree commonly known as, and *called* the Oriental Plane which is really the London Plane. It is of the first magnitude, and has so many excellent qualities that it is the tree *par excellence* of the twentieth century, and might even be said, to be the fashion. Fashions in trees must change to meet new conditions of civilization in cities, where the soil is permeated with gaseous vapors, heated by steam; where concrete and asphalt pavements retain all the poisonous gases, and keep moisture from the roots, and the leaves are subjected to winds laden with tar-oil-dust and sooty smoke. It is for these reasons that this Plane is so universally planted. The leaves develop late, and are not subjected to frost or untoward early spring conditions. This late development makes it undesirable for planting in southern countries, on account of the early hot spring. The bark of the tree is shed in large plates and does not harbor blights, fungi or insects. The foliage is large, and is so strong, that soot and gas affect the leaves but little. It takes the lead in Pittsburgh planting, and is satisfactory, even there.

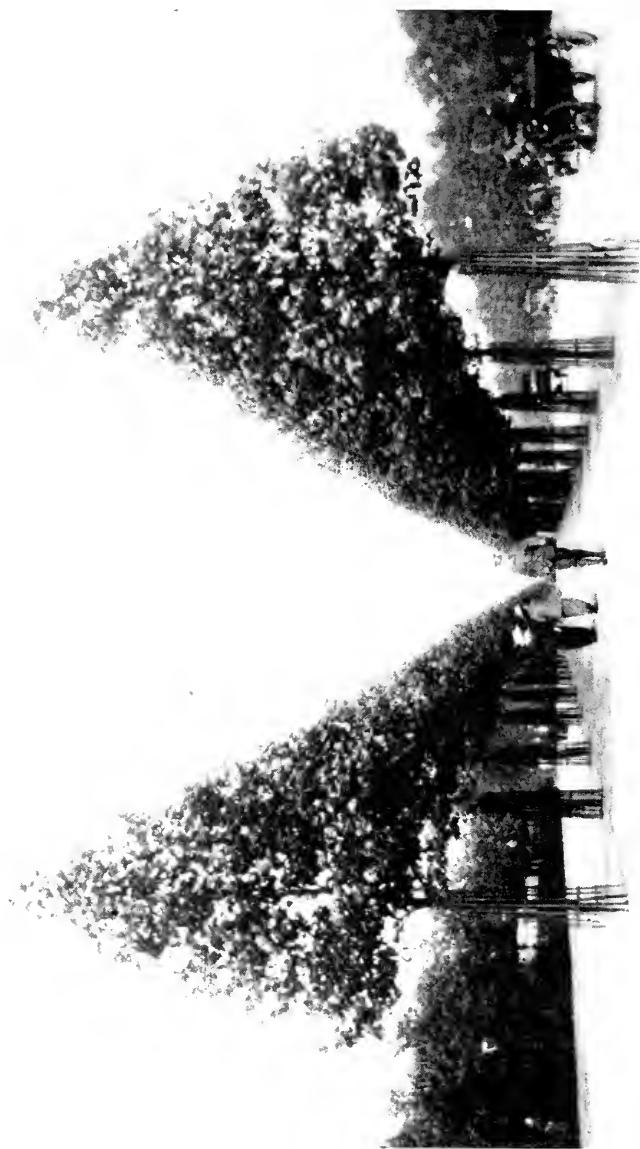
Trimmed, pollard, or pleached trees have always had a peculiar fascination for me. They recall the trimmed fruits, trained *en espalier*, on the stone walls of the terraces of my childhood home where luscious nectarines, apricots, peaches, pears and figs ripened as in Italy, and southern France. These were grown on the terraces of our home in Grace Court, Brooklyn Heights. The house is now torn down. Partly, the charm may be, in making nature conform to our will. The Plane tree lends itself above all other deciduous trees to trimming. It is planted in long avenues on the Boulevards of Paris, trimmed high and shallow, and branched 20 feet from the ground to avoid interfering with traffic on the one hand, and the air and light of the buildings on the other. In Golden Gate Park, San Francisco, the pleached trees meet overhead before the Concert Pavilion, and the seats surrounding a fountain are under this canopy of green. To accomplish this, I have seen the trimmers work from high wheeled scaffolds.



NATURAL DEVELOPMENT OF PLANE TREE
PARK OF LICHTENSTEIN-PALACE
VIENNA, JULY, 1913

The reasons for trimming city planes are many. The pavements prevent sufficient water from reaching the roots, and a trimmed tree requires less moisture than one that develops naturally. The leaves are much larger, and the foliage is less straggling and gives a denser shade. The straight, rounded or oblique forms of the trimmed trees are in harmony with the architectural lines of surrounding buildings. The vistas are more impressive, and in many cases they would be lost if the trees were not trimmed. Where space is limited, pollard, mop-headed trees, or tall shafts are most suitable. In Vienna as an entrance to a small courtyard, I saw two oaks, fifty feet high and as shallow as cedars. In the neighborhood of the seashore or where exposed to high winds, the trimming is all important to preserve a well balanced symmetrical head and prevent the trees from looking wind-swept.

Unfortunately, the Plane is not exempt from the blights and insects which modern commerce has brought to our shores from every country. During the summer I have found many leaves, the veins of which are fastened together by finely spun webs. Opening them, one finds a tiny green worm which later eats the leaves and may often be seen hanging from the tree by its web. This is the larva of a small moth belonging to the family Tortricidae. It may be controlled by using a spray of 2 lbs. of arsenate of lead to 50 gallons of water. Last summer, I noticed a large white woolly caterpillar that seemed to have done much damage. I learned that this was the larva of the Tussock moth. This species, one season, ate all the leaves of the beautiful Plane trees on Pennsylvania Avenue in Washington. The white egg masses deposited by this moth, must be removed in the winter or early spring from the crotches of the tree, and from the trunk near the ground. Then the leaf blight of the plane tree *Gloeosporium nervisequam* caused by late frosts and wet springs, will kill the terminal twigs, and new shoots have to develop from lateral buds a foot or two from the tips of the branches. This blight was severe in 19 7, but not so injurious after the cold, wet spring of 1916. It evidently affects only untrimmed trees, as those I keep trimmed



PYRAMIDAL TRIMMED PLANES
THE MALL—LONDON
SEPTEMBER, 1913

have not been injured by it. A difficulty possibly of more serious moment to us, is the *Platanus* or Plane-tree cough. This is caused by the white down on the lower side of the leaves, which sometimes has an injurious effect on the membranes of the throat.

On my travels, much of my time is spent in parks, and invariably Ober Gärtners, jardiner, head-gardeners and sub-gardeners named Hans, Pierre, Andy or Mike, become my friends. I asked one of them in Hyde Park *why* the Planes were so popular. He answered, "because they are such clean trees, they shed their bark, so do not harbor insects." While it is considered one of its most valuable characteristics, that is, to me, the one, unattractive feature of the tree. I do not fancy the mottled bark, or littered lawn at the season of shedding. It is a source of endless amusement in the summer to small boys and tiny maidens, on their daily chaperoned walk under my trees to and from the beach, to assist nature by peeling off the loosened scales, and patches.

In Paris, in June, 1913, I was shocked when driving on the Champs Elysee to see the leaves of the elm and horse chestnut trees dark, and shrivelled, and many of the branches absolutely bare. The effect was of late autumn, until, beyond the Arc de Triomphe, the fresh beautiful green of the splendid planes assured us that it was still summer. I was interested on my return home, to learn that Dr. Murrill of the New York Botanical Garden went abroad that summer to study these conditions, and found that drought, hot sun and tar dust had injured the elms and chestnuts, while the planes had escaped. Their leaves develop so late, that they are not affected by early inclement spring weather.

That same summer, we motored from Vienna to London. In the Park of the Lichtenstein Palace in Vienna, I found several splendid planes, the trunk of the largest was 21 feet or 7 yards in circumference. It towered above all the other trees, was umbrageous and of beautiful foliage, and reminded me of the great trees of the States of Oregon and Washington. This garden was founded in 1701, and refashioned in the English style in 1836.

In Frankfort, the trees were also blighted and bare, while the planes were as beautiful as in Paris. Along the Schuman Kai is a fine avenue of trimmed planes and in the Kaiser Strasse and Botanical Garden they were trimmed like those in Golden Gate Park, San Francisco.

From the Kurhaus in Wiesbaden I saw how splendidly effective large plane trees could be, when left to develop naturally or with only enough trimming to frame in the distant vista and fountains. The same effect is found in Washington looking from the Capitol down Pennsylvania Avenue.

The planting before the Kurhaus of Homburg was much more informal and showed to advantage the stately beauty of the plane when planted with great oaks, copper beeches and blooming lindens. The view of wood, lake and high streaming fountains there was lovely.

Along the endless highways of Austria, Germany and France the planes vied with Lombardy and Bolena poplars, lindens, maples, apple, cherry and pear trees, hickory and acacia, and sometimes were planted with them. There were more avenues of planes in France than in Germany, and I noticed in the neighborhood of the larger cities and *in* the cities, that almost invariably, the young trees which were set out, were planes.

From Strassburg to Paris, our route led us through the now frightfully devastated zone of northern France. That zone which has again been overrun by the Huns, and where the Toul Sector marks an epoch in the history of the United States, as the place of the American Soldiers first battle on April 20 with the enemy at Seicheprey. I have shuddered to think of the destruction of the beautiful trees we saw then. Frederick Courtlandt Penfield, our Ambassador to Austria-Hungary, after the severance of diplomatic relations with that country, and before his return to America passed through this region lately evacuated by the German vandals. He writes:

The most ruthless and revolting thing that a visitor to the evacuated area perceives, is the total destruction of all trees, fruit-bearing and ornamental. Nearly every tree in the Aisne department has been felled.

Men and money can rebuild the homes and factories in a year or two, but to restore the orchards and other useful trees will call for a half century. What the Germans did to tree life in Northern France was the systematic murdering of Nature, nothing less.

Before the great drive of March 21, 1918, I saw the moving pictures shown by Miss Anne Morgan of these shattered and felled trees, and pictures of the thousands of young trees planted in the reconstruction work on land which has again become a horrible battlefield.

At Boulogne we crossed to Folkestone. We had left the interminable miles of highways on the continent, and from there to London saw only lovely English lanes, hedges and parklike landscapes.

In London the trimmed plane has the sanction of royalty. From the Victoria Memorial Fountain before Buckingham Palace, down The Mall, are six rows of shapely, pyramidal Planes, and between the Palace gardens and Green Park, five rows of these perfectly formed trees beautify Constitution Hill.

In New York, many symmetrical young trees are planted on Riverside Drive, and in Central Park, and from there along the centre of Seventh Avenue. Mr. Frick had horse chestnuts planted before his house at first, but they were a failure, and he now has the planes.

Two wind-swept treeless acres had come into our possession, not three minutes away from the Atlantic Ocean, with only low sand dunes intervening. It was said by those who thought they knew, that we were beyond the tree limit, and as a proof of this assertion they pointed to the few trees in the neighborhood, all of which, had succumbed to stress of storm and salt spray, and were barely more than tall shrubs, with tops that bent wearily away from the all prevailing winds. And I had had visions! Visions, of shrubberies with a broken skyline framing green lawns, of groups of evergreens for winter cheer, of beautiful specimen trees, and these as the setting of an enclosed garden, with flowers blooming around the central gem—a Grecian fountain. Decidedly—the tree line must be

changed, and it was, by means of close planting, and the protection given by the buildings on the place. Now, I could carry out my cherished plan of an avenue of plane trees similar to those I had seen in Switzerland.

As I found it impossible to procure young trained trees from the nurseries, in the Spring I ordered some of the regular stock, insisting however, upon absolutely straight trunks, headed high. These were planted twenty-three feet apart. The "tree limit" spectre caused me to superintend every detail of that important function. Holes larger than the diameter of the roots were prepared, with broken sod at the bottom. Then, 6 inches of well decomposed manure was covered with a layer of top-soil, upon which the tree was placed. As the finished planting must be exactly as it was in the nursery, a lath laid across the hole decided the right depth, and special pains were taken to have the tree perfectly erect. White sand was then sprinkled over the tiny rootlets, and fine earth solidly tamped in among them with a rounded stick. When the roots were firmly covered, a few inches of manure was added and the hole filled with earth to within two or three inches of the top. Much water was then allowed to run in from the hose, and the following day the earth was made level around the tree. A few weeks later, the trees were again thoroughly watered and after cultivating the next day, a thick mulch of compost was put around them. The only pruning at the time of planting, was a little root and enough top pruning to balance it. In the late autumn each tree was anchored to the ground, by means of wires passed through a small piece of rubber tubing, to protect the tree. The wires were attached to three strong pegs driven firmly into the sod. So, they defied the winter storms, and early the following spring the training began. Taking a rod 15 feet long, the top of each tree was cut off at that height, and the lower branches trimmed off to an equal distance from the ground, about 7 feet, leaving the remaining branches as long as possible, but of the same length. The upper branches were trimmed to make the tree the shape of an expanded mushroom. The next year the upper trimming



TRIMMED PLANE IN WINTER
"THE DOLPHINS"
EAST HAMPTON, LONG ISLAND

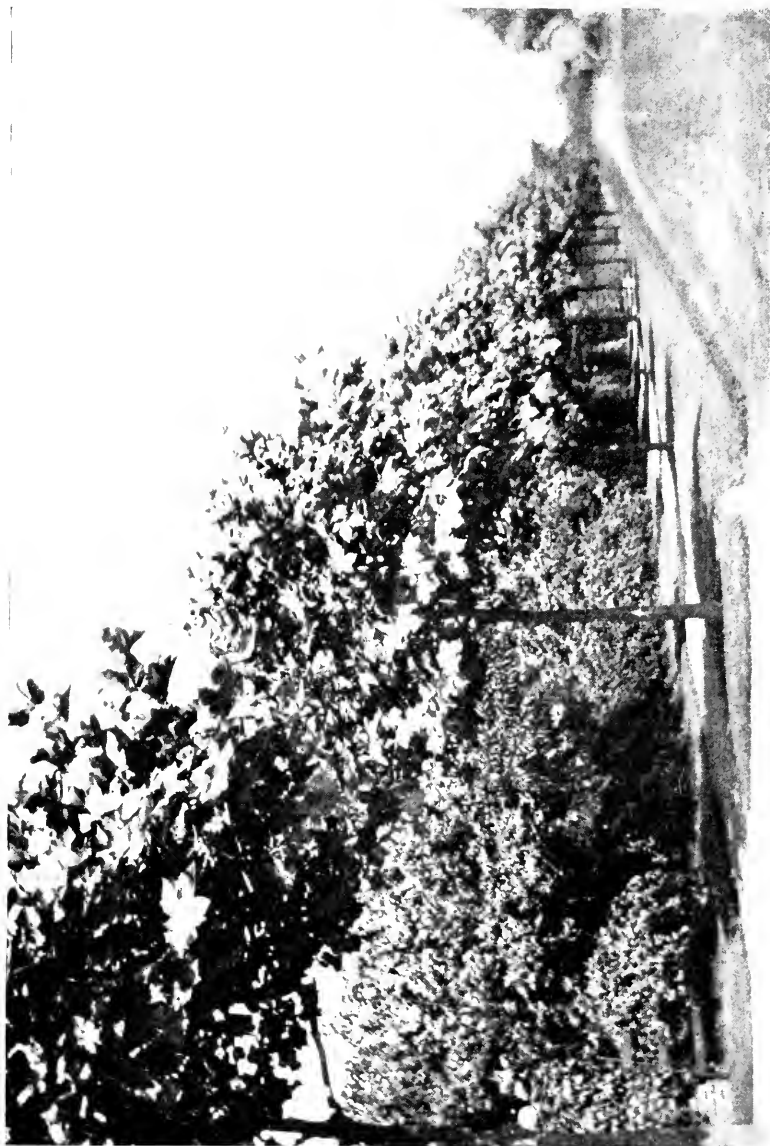


TRIMMED PLANE IN SPRING
"THE DOLPHINS"
EAST HAMPTON, LONG ISLAND

was about the same, leaving on each branch two more eyes, while the lower branches were allowed to grow out, always preserving the mushroom form. Tableaux: Our old gardener on a ladder, head and shoulders above the middle of the tree, with shears in hand:—standing below, the enthusiastic superintendent directing each fateful cut. “A little higher up, no, that is *too* high,—there now, yes, that is just right, fine!” So, I would direct as I walked around the tree, viewing it from all sides, to attain perfect symmetry. By the third year, the frame-work of the trees was established, and the veriest tyro could trim them, and give the necessary summer pruning of the small boughs from the lower plane of the trees, as this line must be perfectly horizontal, for the pleached arbor effect.

The lower branches of the trimmed trees now have in spring a spread of 16 feet diameter. The canes of the past summer's growth which were cut off measured 9 to 10 feet. The annual pruning, besides being necessary to preserve this hedge in the air, is the cause of trebling the size of the leaf. My patience and perseverance have been rewarded by shapely, rounded, well balanced domes giving broad shade and protection from sun, rain and wind.

Strolling under them, I recall a late afternoon on Lake Geneva. A high stream of water from a lake fountain before the English gardens radiating all the colors of the rainbow in its falling spray. The shadows of Mt. Blanc deepening on the lake; its peaks shining in the sun and partly covered with a filmy drapery of bright clouds; the half moon above in the blue sky. As the sun sets, faint, rosy tints illumine the mountains, spreading over them and gradually deepening until lake and sky glow in color—a vision of loveliness. Suddenly, the wind changes! A fresh salty breeze brings me back to the present. Before me, is a glimpse of grey sand dunes. I hear the roar of breaking surf on the beach beyond; see the distant white caps; the alpine-like cumulous clouds on the horizon are aglow in the sunset, and their light is reflected over the broad expanse of the Atlantic.



TRIMMED PLANES IN SUMMER
"THE DOLPHINS"
EAST HAMPTON, LONG ISLAND

Letter of E. H. Wilson*



AM back from the trip to Arisan and have but one regret which is that you too were not present to enjoy the forests and the giant trees. I had expected much but what I saw far exceeded my expectations. The forests are easily the finest and the trees the largest

I have ever seen. Commencing at about 3000 feet altitude, the forests densely clothe the steep mountain slopes up to 9000 feet altitude. From the base up to 6000 feet altitude the forest is composed of evergreen trees, chiefly Fagaceae and Lauraceae, with huge climbers scrambling over them and a dense jungle-like undergrowth of small trees, shrubs, Ferns, etc. At 6000 feet altitude *Chamaecyparis formosensis* first appears, extends up to 8600 feet altitude, and between 7000 and 8000 feet altitude is the dominant tree. The other *Chamaecyparis* commences at 7000 feet altitude, but is only common between 8000 and 9000 feet altitude. The *Taiwania* (which is the tallest tree in the forest, averaging between 150 and 180 feet in height and often ascending to 200 feet) grows scattered through these forests from 6500 to 8000 feet altitude. This is the oldest type of tree here, and in ancient times with the *Trochodendron* probably formed extensive forests, but has since been worsted in the struggle by *Chamaecyparis formosensis*. On exposed cliffs and ridges above 7800 feet altitude *Pinus Armandi*, *P. Wyematoni*, and *Tsuga formosana* grow in fair quantity. *P. Armandi* attains a much greater size here than in China. In clearings, and especially where landslides have taken place, anywhere from sea-level up to 7500 feet altitude,

* Letter of E. H. Wilson from Taihoku, Formosa, February 16, 1918 to Professor C. S. Sargent, Director of the Arnold Arboretum; published through the courtesy of Professor Sargent.

Alnus formosana is common and often forms pure woods, but other deciduous trees are exceedingly rare.

The country is very steep and savage and traveling over it is hard work. Thanks to a light railway and courtesies extended by the Government things were made as easy for us as they possibly could be. The weather on the whole was good though two consecutive days of rain and sleet and many foggy afternoons were a hindrance. The *Taiwania* interested me most, and it is certainly very near to *Sequoia*. The *Chamaecyparis formosensis* is the largest tree, being sometimes nearly 200 feet tall and 65 feet in girth of trunk. The average is from 130 to 150 feet by 30 to 40 feet in girth of trunk. Its crown is rather scraggy and is composed of several erect, spire-like stems with weak and sparse lateral branches. It is not a handsome tree by any means but its bulk is most impressive. I was informed that the oldest tree which had been felled showed about two thousand seven hundred annual rings, and a large one standing is estimated as three thousand years old. The trunks are mostly hollow but the wood, which is reddish, fragrant, and has a beautiful satiny lustre, is much esteemed by Japanese for interior work in houses. The other *Chamaecyparis* is a smaller tree (120–150 feet x 18–30 feet), has a handsome dome-shaped crown and is in every way a superior tree. The trunk is nearly always solid and its wood is very durable, easily worked, and suited to every kind of construction work.

Conifers Collected on Arisan

<i>Chamaecyparis formosensis</i>	<i>Pinus taiwanensis</i>
<i>Chamaecyparis obtusa</i>	<i>Pinus Uzematsui</i>
<i>Cunninghamia Kawakamii</i>	<i>Taiwania cryptomerioides</i>
<i>Juniperus formosana</i>	<i>Tsuga formosana</i>
<i>Picea morrisonicola</i>	<i>Cephalotaxus Wilsoniana</i>
<i>Pinus Armandi</i>	<i>Taxus cuspidata</i>
	<i>Pinus brevispica</i>

Some Novelties in Roses

By Charles H. Totty



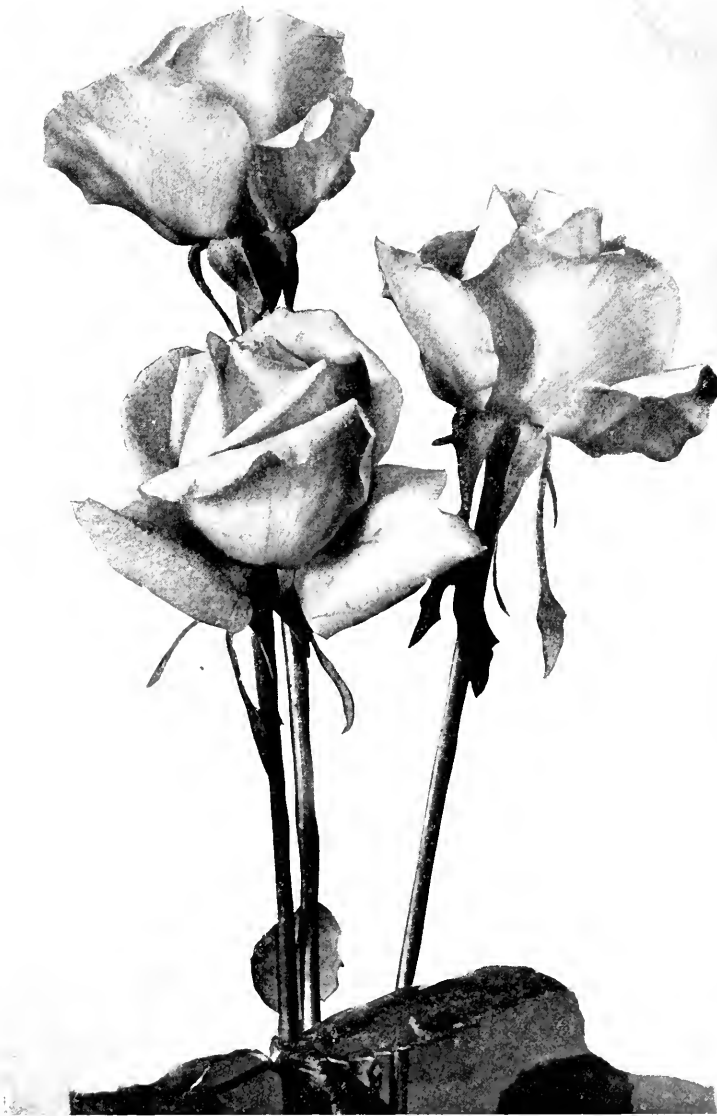
THE cataclysm in Europe has somewhat disorganized the originators of Novelty Roses, who have for some years been giving us the best of their introductions. The latest lists give us a series of introductions from the Irish firms of McCredy and Dickson, who are splendidly represented, this year.

The Dickson variety Lillian Moore while not exactly a Novelty was distributed in a very limited quantity last year but it will be recalled that this variety was considered the best of 600 seedlings on test at the Panama-Pacific Exposition. Flowers of this variety when fully expanded reminded one more of a Camellia than they do of a Rose. The number of people who like yellow Roses is legion and all should try Lillian Moore.

The 1918 Novelties of Dickson's also give us a yellow in F. T. Crozier, but the color of this variety is very much paler than of Lillian Moore. One could wish with its splendid large flowers and mildew-proof foliage that the color of Crozier was a little deeper when developing. This is one of the largest Roses we have had the pleasure of testing and should be very valuable when generally distributed, owing to its vigorous, even and massive growth.

So far as growth is concerned, the same thing may be said of the Marchioness of Ormond. The color of this variety is a lovely shade of delicate blush deepening toward the center.

Another variety "Blushing Bride," gives us also a flower of great refinement, a clear white with faint blush in the center. Hugh Dickson, the raiser, says this variety should eventually displace Druschki, and if it is good enough to do this it is



COLUMBIA

wonderful indeed. Time will show in any case. These delicate shaded sorts will be valuable because we were getting too many yellows and deeper shades without having any lighter shades to keep up the balance.

Ulster Volunteer, the last one of the Dickson introductions for 1918 is a Single Rose of the same type as Ulster Standard; Irish Fireflame; Elegance; Harmony, etc., etc. The color of Volunteer is a brilliant cherry-red with a zone of white at the base. What a pity that these exquisite Singles are so short-lived, during our hot summer weather. In brilliancy of color I always think they excel over any of the other types of Roses, and Ulster Volunteer is the most striking of any introduced to date.

A McGredy Novelty for 1918 that is particularly fine is the Golden Emblem. The raiser claims that this flower as grown outdoors is a much improved Rayon d'Or and is just as perpetual in bloom as is Killarney. I was under the impression from its hollylike foliage that it contained *Pernetiana* blood but if it is as free as McCredy claims it is, this is apparently erroneous.

There are two American varieties that are practically Novelties and there are Los Angeles and Hoosier Beauty, both offered last spring. Los Angeles* is one of the very strongest Roses ever introduced, and as it was raised in the brilliant sunlight of Southern California it will stand extreme weather conditions much better than the more delicately shaded varieties we get from Europe. The description of Los Angeles by the introducer was certainly an example of fine writing, and is as follows: "Growth very vigorous producing a continuous succession of long stemmed flowers of a luminous flame pink, toned with coral and shaded with translucent gold at the base of the petals, etc., etc."

Every Rose lover should have this variety and they will be just as enthusiastic over it as the introducer, and this variety will soon occupy a prominent place in the garden of every Rose

* A colored picture of this Rose was published in the JOURNAL for December, 1917—
Ed.



OPHELIA SUPREME

grower as soon as it can be purchased at a reasonable figure.

The other American variety, Hoosier Beauty has established itself as one of the most valuable crimson Garden Roses ever grown. There is no other Rose in this color as free in growth as Hoosier Beauty. A plant of this Rose set out from quite small pots last May gave us a wealth of wonderful blooms with two and three feet stems, throughout the entire months of September and October, fully equal to any Rose buds we ever cut in the greenhouses. The petalage of the buds are of a very heavy texture and the crimson-scarlet color does not turn black or discolor with our sun and we predict for Hoosier Beauty the premier place in crimsons.

H. D. M. Barton, a last year introduction of Hugh Dickson's is a wonderfully free Rose, also in crimson, but does not give the quantity of blooms that Hoosier Beauty will give, still Barton has a place in this category because a bush of this variety is never out of bloom and in fact most of the time is a flaming landmark.

In the newer varieties of Pinks, while not very strongly represented, is the Ethel Dickson, the color of which is a deep rose, with a silvery reverse, showing refinement in every line. It has not been, however, as vigorous with us as the old standby Chatenay and therefore, may not become so popular.

Cleveland deserves to be better known and doubtless will be in the course of a year or two. The yellow shading at the base of each petal prevents the pink from bleaching out of the petal, which seems to be a fault that most pink varieties have. Cleveland does not make a long growth but makes quantities of flowers, still, one could wish it were not quite so thorny. In this respect, however, it is not as bad as Herriott and others of the *Pernetiana* type.

While on the question of thorns: One of the reasons for the popularity of the well-known Ophelia, is its comparative immunity from thorns. No Rose we ever distributed made such a wonderful showing as this Ophelia and its influence on American horticulture is going to be still more strongly felt

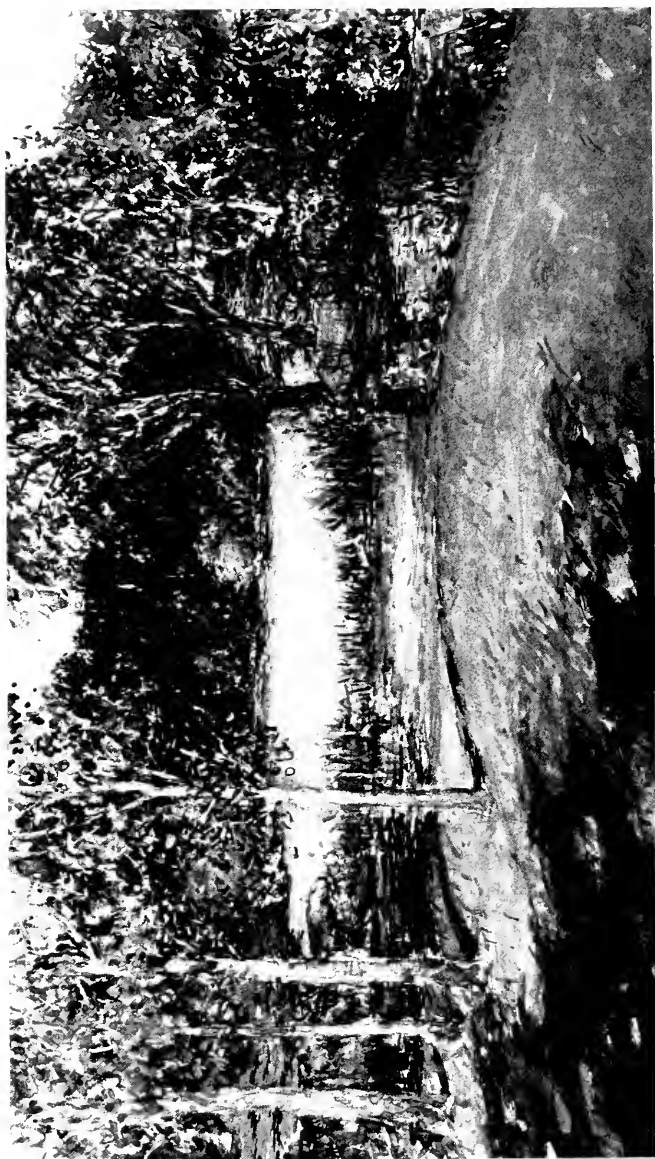
in this present year's introduction—Ophelia Supreme. This gives us four Ophelia sports this year: Supreme, the best one of the lot; Rosalind, Silvia, and Evelyn. The new variety Columbia is a cross from Ophelia and Shawyer with the former as the mother parent. Columbia has not yet been tested for outdoor growing but History has repeatedly shown us that the Hybrid Tea that is free enough to be a good forcing Rose is invariably a good outdoor Rose also as were such kinds as Ophelia; Shawyer; Russell; Radiance; Lady Alice Stanley; Hoosier Beauty, etc., etc.

Let us, even tho' we are at war never neglect the ennobling and refining influence of the Rose the "Queen of Flowers," and continue to plant and grow them in our gardens.

Madison, New Jersey.



LILLIAN MOORE



PLAYERS GREEN
COLUMBUS PARK
CHICAGO

Outdoor Theatres^{*}

By Jens Jensen



THE play of the American is born in the out-of-doors. The life of the early Pioneer, was closely woven into the forest and the field. Wild beauty—the romance of the stream and forest was his play-field. Primitive man, and himself, the actors or spectators as it happened to be. Here is a richness of material, of romance and nobility, of color and beauty, equal if not surpassing that of any other country.

The early settlers were idealists, they were not on conquest bound. They wanted to build their homes where they would be free to cultivate their ideals, and live their own lives as they saw fit. They brought with them a great deal of that which was the best of their race. The Indian was no less of an idealist. He had a civilization of his own, rich in sacrifice, and chivalry, full of poetry, and romance, with a mythological back ground. That this simple life of early American occupation has exerted its influence upon its descendants, in cultivating a love for the out-of-doors can not be doubted. That out of the simple play of the Pioneers should spring a desire for greater efforts in that direction can be expected, and it must be conceded that out of

^{*} This and the next article show interesting if somewhat violent contrasts in their conception of the out-door theatre. Mr. Jensen, who has designed, among many other beautiful things an outdoor theatre for Columbus Park, Chicago, is insistent upon the theory of American theatrical art being rooted in our primitive origin. From this follows an outdoor theatre fitted to such a conception rather than to older ideas based on the Greeks. The writer of the next article, however, describes an equally beautiful, but classic Greek theatre, the design for which he drew for Briarcliff in Westchester. In the December, 1917, issue of the JOURNAL, Mr. Caparn reviewed Professor Waugh's book on Outdoor Theatres to which readers are referred. Both sides of the question are there dealt with at more length than is possible here.—ED.

this rich and romantic life of the Pioneer, the American drama will be born.

The desire for plays in the open is a growing thing, and the native play will come as soon as we have found ourselves. So far we have been contented with borrowed productions especially written for the indoor stage. The drama out of doors must be woven into its environment. The drama fitted to it, not the environment fitted to the drama. This gives us a richness and beauty of a higher intellectual expression than can ever be accomplished on the indoor stage where cheap artificial setting always must have a lowering influence on art values.

It is in the out-of-doors (where thoughts are pure, life simple and actions noble) that the drama must be reborn. The setting is sublime; noble trees form the proscenium; the mystery of the forest the back ground; the meadow the stage, and the auditorium. Blossoming things, all growing living things form the decorations. Into all this the drama has been woven. There are no artificial decorations, no artificial illuminations. These belong to the indoor stage with its ever changing decorations. It must not be a Greek theatre, for that belongs to the past, to the museum and library. Its expressions are not of our life, for it has no teaching to give to our youth. It is not of our day, it is looking backward, not forward. The drama belongs to the present, and the future. It is one of the great forebearers of culture, and should deal with what is best, purest, and noblest, in the lives of all peoples of the race. The drama should be the disseminator and builder of all that is best in our lives.

The drama out-of-doors may be as varied in its interpretation as the character of the place in which it is enacted. The mountain or hill may have its trolls, and the meadows their fairies; each may express itself, and the life of its people. The first rays of the rising sun may be woven into the play, and open the performance against a setting, illuminated by the birth of the day. Sunset will have equal importance to the play out-of-doors. What can surpass the opening act lit up

by the last rays of the setting sun with the heavens all afire, and the last act in the dark mystery of the night brightened by the flickering light of a hidden pyre? Or the play might be dedicated to a moonlight setting on snow clad fields, and starry nights. These are compositions of the master mind.

Every part of the country will give what is within it, and thereby make each section rich in what it has to give, and make life richer for it. Community centers, and gardens, parks and reservations may vie with each other in encouraging the drama out-of-doors, and developing local talent. Thus it will



PLAYERS GREEN IN THE AUTHOR'S GARDEN

do its part in the final work of building a great race. Gardens, large or small may have their players green for minor dramatic productions. Children may have performances all of their own making. Drama and music may compete with each other for a place in this sanctuary of the out-of-doors.

The players green may become the shrine of the gardens, a poetic expression in growing things. Cedars and Aspen, Western Crabapples and Sugar Maple, Elms and Hawthornes, Birch and Juneberry, each group forms a composition with a spiritual beauty all its own. For minor notes in the composition or for color in spring or fall, Sumach, Flowering Dog-

wood, Sunset Dogwood, Native Roses, Junipers, Asters, Goldenrod, Daisies, Violets, and carpets of early spring flowers, may add a poetic loveliness if properly used or a frivolous charm if over done. Each composition with its own particular type of beauty may influence the character of the play at certain seasons of the year when through the colors of flowers or foliage, the poetic values of the picture are at their highest. Imagine for instance, the pink blossom of the Crab-apple in May against a back ground of the pink and silver buds of Oak and a canopy of the deep blue sky above, decorated with fleecy floating clouds or, the stage all afire in its Fall coloring at sunset time. One of the greatest delights of the players green is its ever changing beauty; it never repeats itself, and therefore never becomes monotonous or tiring. Water may add to the composition of the players green, and make possible a greater variety of plays.

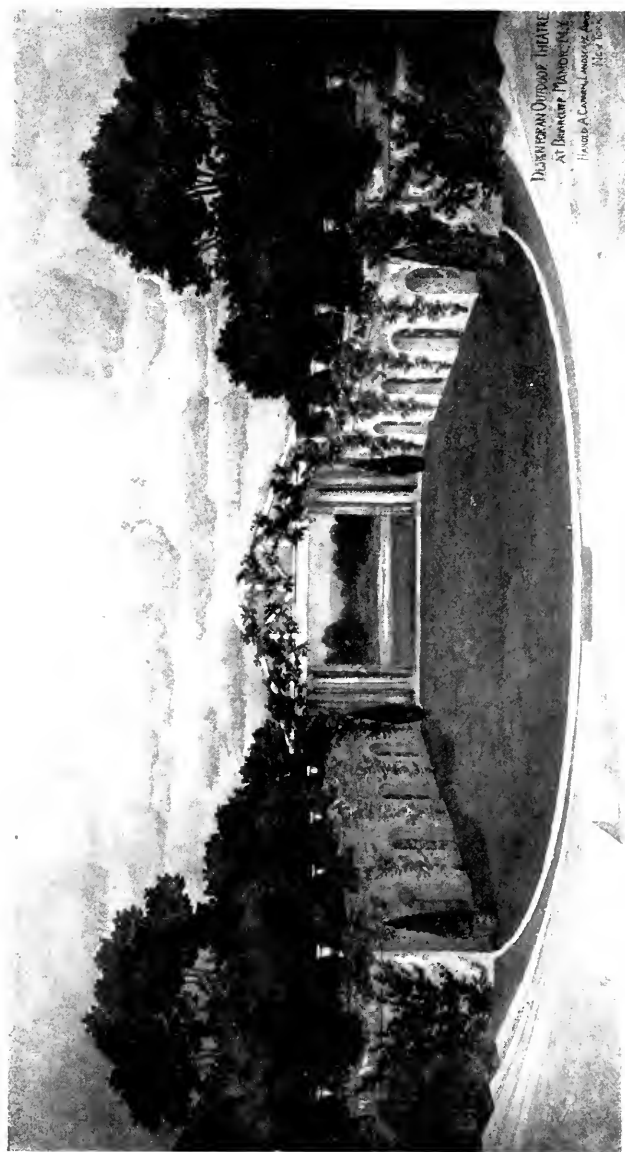
Let us consider the plan of the players green. Paths should lead in from all directions permitting freedom of access and retreat, and opposite paths should enter near the front so as to permit pageants to pass across the green. For the footlights are in two sunken fire pits, partly hidden by boulders and out of these pits the flames burst forth as if coming through the crust of Mother Earth. The charm and weirdness of these fires on a dark night cannot be described. They offer light and shadows full of romance and mystery such as no other light can produce. Their influence on the play enacted is wonderful. What a contrast with the artificial product of our hidden stage! I remember a few years ago, seeing "As you like it" performed in a fairly good natural setting. Strings of electric lights such as commonly used in our cities, and the search light, played in competition with the silvery moon that with all its poetic power was trying to flood the stage with its beautiful rays. What a travesty on intellectual life.

One of the vine covered boulders mentioned before may serve as a council rock, from which local poets or sages will give their messages to their people, or from which singers may send forth their thrills or philosophers preach the gospel of the out-of-

doors. The boulder is first of all, the herald of pre-historic things.

The whole composition of the players green is a symphony of great beauty, its merits are beyond man's conception. Its beauty plays with the soul. It is into this realm of beauty and romance that the American drama in the out-of-doors must weave itself into a fabric whose cultural value will illuminate the world.

Chicago.



OUTDOOR THEATRE AS SEEN FROM AUDITORIUM

A Design for an Outdoor Theatre

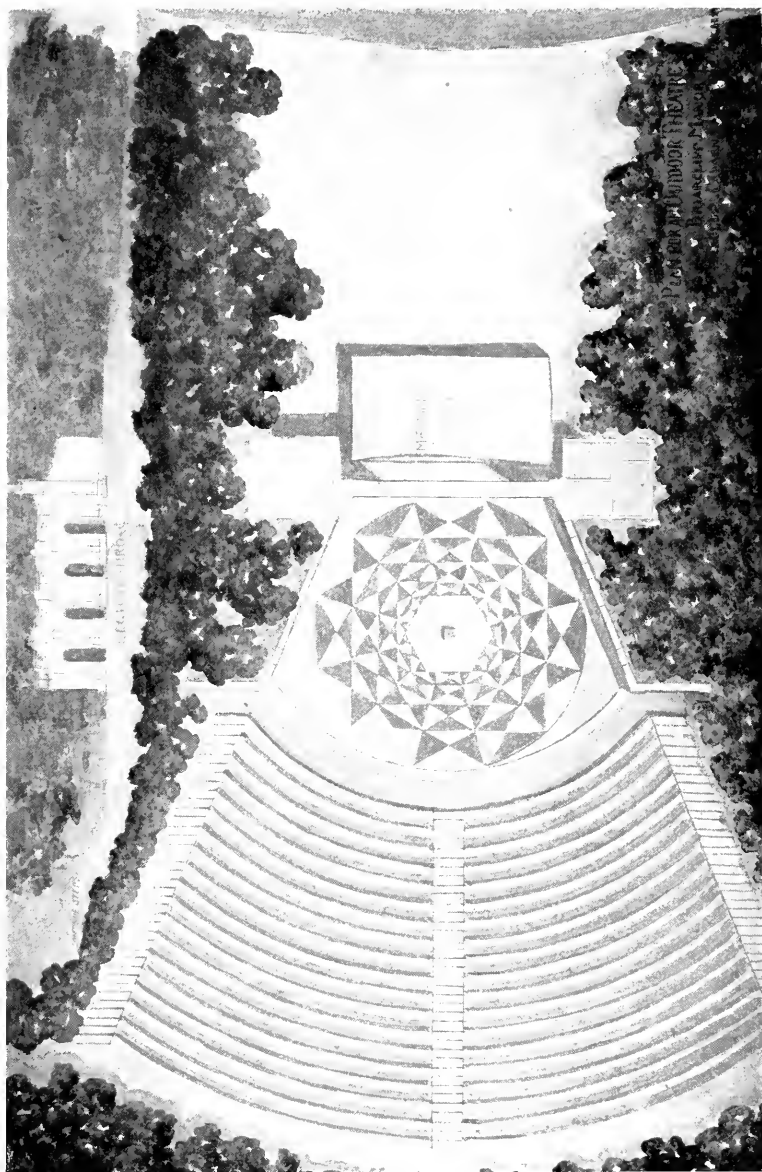
By Harold A. Caparn



HIS design for an outdoor theatre was made for a syndicate in Westchester County, and laid on the shelf like so many other projects having no obvious relation to the war. It is presented here in the hope that it may be of interest, even in these perilous times as a thing worthy of realization, if not now, in a more propitious season.

As far as the writer knows, this scheme differs from any yet constructed in providing a theatre usable not only for any play that can properly be given out of doors, but for complete presentation of the classical Greek drama. These imperishable monuments of dramatic art are becoming increasingly more popular, yet when they are given, not merely the scenery, but the stage and orchestra have to be constructed. As the Greek drama was an evolution from the choric dances of primitive times, the Chorus was always retained and went through rhythmic movements round an altar on a circular space in front of the stage and five or six feet below it, intoning at intervals their comments to explain the action on the stage and fill in the pauses. This circular space was the orchestra.

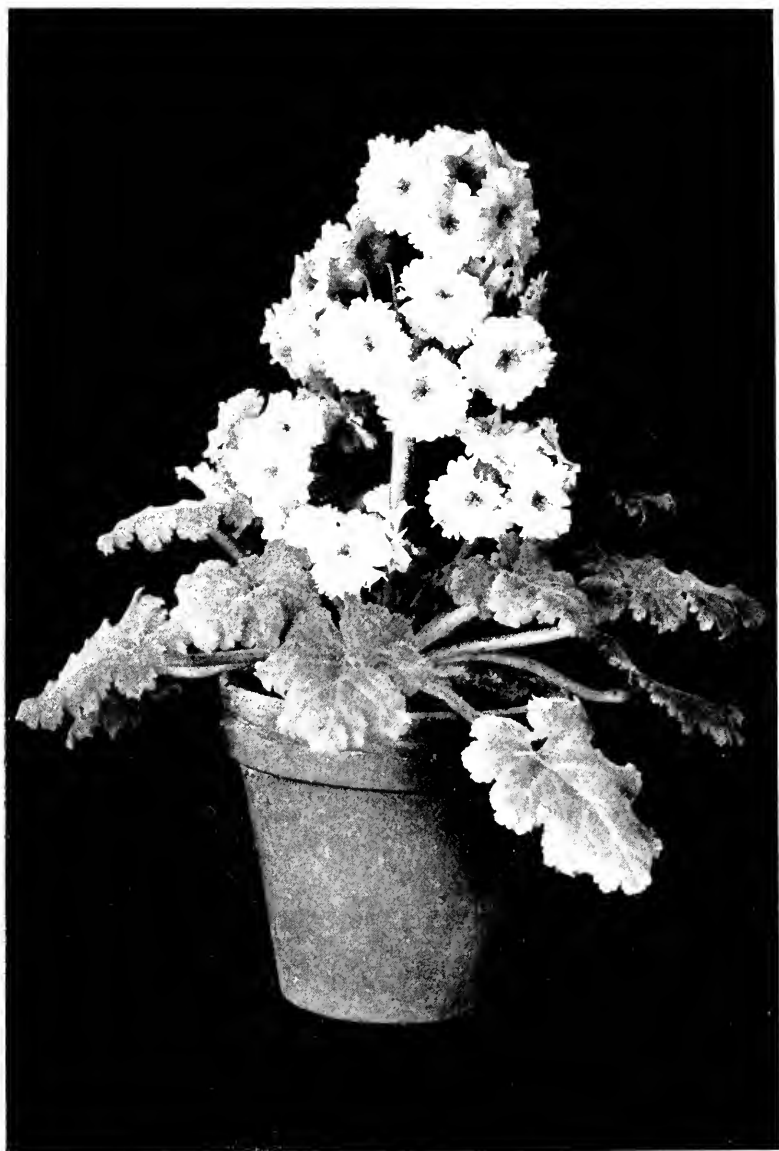
In the scheme here illustrated, a grass stage of an extreme width of sixty feet is enclosed by walls or wings with side entrances and curtains at the back which could be kept as a background, covered by a backdrop, or drawn so that the landscape beyond would take the place of a backdrop. It would be



PLAN OF OUTDOOR THEATRE WITH SECTION THROUGH CENTER,
SHOWING STAGE USED AS ORCHESTRA AND
MOVABLE STAGE FOR GREEK PLAYS

easy to put a temporary background across any part of the stage so as to make it as deep or shallow as might be desired.

When a Greek play is to be staged, a mat of the desired pattern and forty-five feet in diameter is laid over the grass stage which becomes the orchestra. The tall columns and open wood pediment with the curtains are movable, and for the presentation of a Greek play would give place to a movable stage with the necessary scenery. All this apparatus could be constructed so as to be easy to move or install and could be kept in a convenient place of storage when not in use, under the seats or elsewhere. Six dressing rooms are provided. The seats are intended to be built into the side of a hill, and as shown on the plan, would accommodate an audience of twelve hundred. They are intended to be built of concrete, but could be of wood, or camp chairs on grass terraces. But the cost of concrete would not be very much greater than that of wood, and in view of its permanence and needing no upkeep or repairs, would be, in the long run, more economical, while its massive and handsome appearance, in harmony with a stage enclosed like this, would make a unified structure adequate not only for the presentation of modern plays, but also of the Greek drama in a setting sufficiently like that of twenty-three hundred years ago. Though somewhat ambitious in appearance, this theatre is simple in design, and would not be costly to construct in concrete, even at current prices.



CHINESE PRIMROSE
PRIMULA SINENSIS
STOCKY, LARGE-FLOWERED TYPE

Primroses

By Lua A. Minns

'That rose which from the prime
Derives its name.'—Wordsworth.



THE common name of this charming group of plants has come down to us from our Latin philological ancestry through the old French. In early times it meant a daisy, member of another and far-removed plant family. The Latin word was *primus* (first), and the old French called the little early-flowering daisy *Primeverole*, the first spring flower. Chaucer wrote it *Primerole* and applied the term to describe a pleasing young woman. But before Linnaeus' time plant names had strange habits of dissociating themselves from their owners and becoming attached to new owners. They would now, had we not good botanists who hold conferences and lay down laws, for few things are more flexible than spoken language. So, sometime in the sixteenth century, probably before Shakespeare immortalized the "primrose path," the name of this little plant, now the *daisy*, had become associated with an entirely different, but early spring flower. And then someone gave it a diminutive Latinized name, and we have *Primula* as the generic or group name of some of the most charming spring flowers. Linnaeus is generally accredited with having given the name to the genus, but it was used with some species at a much earlier date; in 1629 said to be in common use, and found in writings as early as 1570.

Of what does one dream when a primrose is mentioned? Until less than a hundred years ago he dreamed only of sunny banks of streams, of the more open wood, of nooks and corners in sheltered places; of all these in the time of opening leaves in the sweet moist spring air; of pale yellow, scented flowers

peeping forth from their thick cluster of fresh green leaves "to give an earnest of the spring." If the dreamers saw the flowers in rows or clumps in neat English gardens, he yet breathed the country air and felt it was only graciousness on the part of the flowers to allow their transfer to the restricted area of the garden.

But there are primroses and primroses. Not all are pale yellow, nor do all grow wild in English countrysides. The Common Primrose, Polyanthus, Cowslip, Oxlip and Auricula—primroses all—have near relatives by the several hundred round the world in the north temperate regions, extending well into the tropics where high altitudes furnish suitable conditions. They are well distributed throughout Europe, especially in the mountainous parts; in Abyssinia and Arabia; in India, Siam, Thibet, China, Siberia and Japan. America has not many, yet the Rocky Mountains, Canada and Greenland furnish representatives. Even in the hanging valleys of Central New York one dainty rare primrose (*P. mistassinica*) was left us when the ice-sheet retreated north centuries ago. China, however, so far has furnished us the most; her rich mountainous regions are only beginning to be explored; and almost every year in this century has witnessed the discovery and introduction to cultivation of primula gems, most of which are yet practically unknown to horticulture, at least in this country.

When Dr. Bailey compiled his new *Standard Cyclopedia of Horticulture* he listed two hundred species of *Primula* in cultivation—more species than of any other genus. It is in English gardens and greenhouses that these are all to be found growing; very few in America.

However, from among the many used by Europeans, Americans have taken up readily a few species adapted to their conditions—a few for the greenhouse and conservatory, with which it is my purpose to better acquaint you, and a few hardy garden species, which is another story. Probably when *primrose* is mentioned here one thinks of a charming winter-blooming pot plant with a goodly number of well-arranged green or reddish leaves and clusters of white, pink or red

flowers, or long-stemmed clusters of dainty lilac flowers arranged in small vases and baskets. These indoor primroses have come to us from the Orient by way of Europe, principally through France and England. Not one has been discovered by an American explorer, nor introduced to trade by an American firm. This is not necessarily to the discredit of Americans. In the brief history of American floriculture we have been busy introducing plants from our own rich flora, and in many instances, remarkably adept in originating new varieties of flowers long cultivated in Europe. Americans grow mainly four species of primroses and their many varieties; occasionally two more species, and should know what another looks like. Doubtless some of the recently discovered species will be found adapted to our uses and conditions when we shall have tried them out. The subject has not been studied carefully, but we are glad to report that there seems to be increasing interest in the genus, especially in the hardy forms.

Chinese Primrose

The Chinese Primrose (*P. sinensis* Lindl.) is *The Primrose* in many people's minds. Only until recently, if at all, have they known any other. As most commonly known, this is a low herbaceous plant, with a rosette-like cluster of leaves growing close to the surface of the soil. These leaves are mostly cordate-ovate, prominently lobed, having long stout petioles, are covered thickly with soft hairs, and are often reddish to deep reddish-purple on the petiole and under side of the blade. In the centre of this cluster of leaves rise successive stocky stems bearing one or two whorls or large salver-shaped, bright-colored flowers—white, pink, magenta, salmon, crimson, blue. The plant is at its best when the first cluster is in full flower; later it often becomes irregular in shape. The calyces remain green for some time after the corolla has faded, not unpleasing in themselves; but too often the corollas persist, faded and shriveled, and make the plant look ragged and in need of grooming.



STAR PRIMROSE
PRIMULA SINENSIS STELLATA

Europeans first saw this species growing in Chinese gardens nearly one hundred years ago. It is to John Reeves, an English tea-taster in the employ of the East India Company and stationed at Canton, China, that we owe our first knowledge. He observed the plants in 1819 and sent home Chinese drawings of them to the Horticultural Society of London. The drawings attracted much attention. These English horticulturists had trained eyes for any new plant that might be of value to their gardens. The Society, of which Reeves was a corresponding member, asked him to send home seed and a plant. This he did, but the plant died on the way and the seed failed to germinate. The next year, however, one Captain Richard Raws, succeeded in bringing home to England a living plant of the new primrose which he gave to a relative in Kent. It flowered, probably in 1821, and was named *Primula sinensis* and *Primula praenitans* by different botanists. *Primula praenitans* doubtless had priority and was used by some botanists until recent times, but as *Primula sinensis* the plant is now almost universally known. So much did this plant differ from other known primulas, in fact from all others now known, that it has sometimes been assigned to another genus, and in some present-day classifications stands in a primula section by itself. In 1824 Lady Long exhibited the first specimen of Chinese Primrose before the Horticultural Society of London and received a Banksian medal. By 1826 quite liberal distribution was being made of seed, some probably from the original plant and its progeny and more coming direct from China.

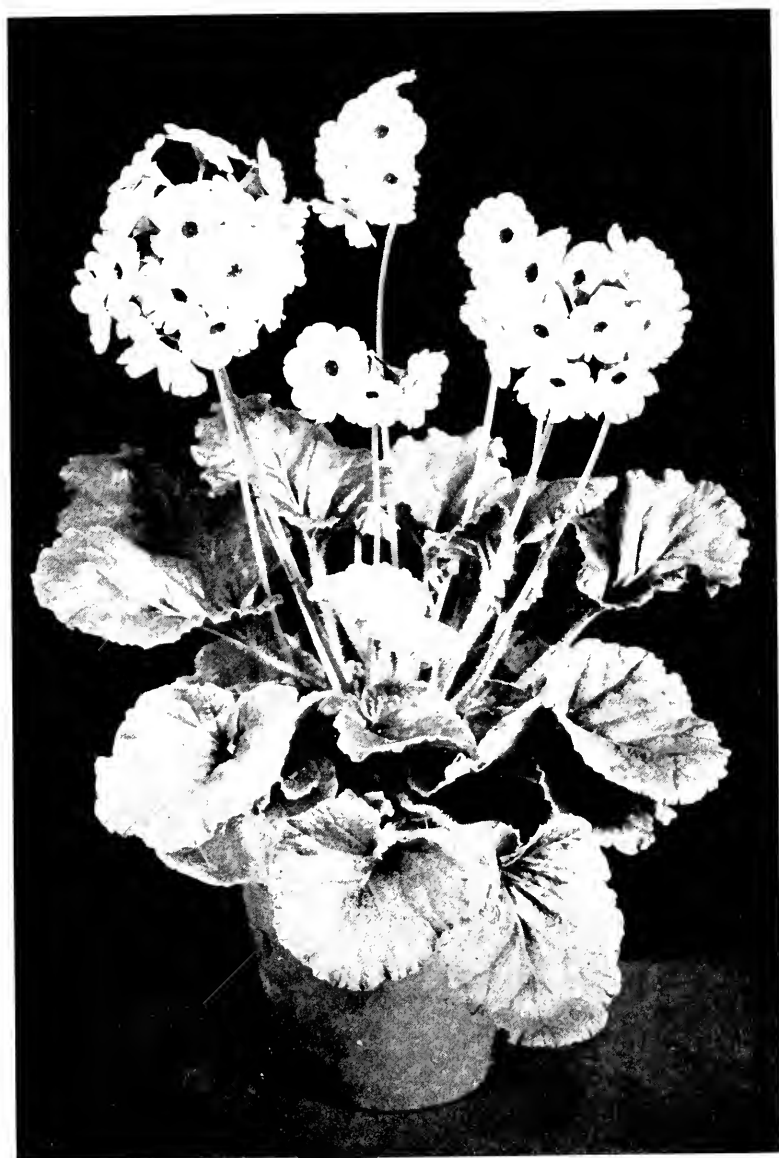
The first figures of this primrose (Lindley's *Collectanea Botanica*, 1821 and *Botanical Register*, 1821) show it to have been of rather slender growth compared with many now exhibited, and having light purplish-crimson flowers with yellow eyes. Ker's plant, the one named *P. praenitans*, and figured in the *Botanical Register*, had slightly wavy, fringed corolla lobes. One figured and described in Curtis's *Botanical Magazine*, 1825, had the corolla lobes smooth and even, but with a terminal notch. Seed of plain-lobed plants seems to have

been most widely distributed at first, for some catalogues mentioned fringed sorts as having been introduced in 1833. From then on the fringed sorts were more popular for a long period. With such early variations in the form of the flower it is not remarkable that variations in color soon appeared. In 1835 white and purple varieties were mentioned in an English publication; by 1838 or 1839 double white and double rose-colored (plain edged) were noted; about 1850 red and white were grown in Germany. The Germans and French had not been slow in making use of this foreign primrose and to their careful work we owe many fine varieties. In 1855 a glowing crimson color was added to the list; by 1860 the list included rose, white, purple-crimson, blush, pink, flesh-color and flaked red with white stripes. Mention was also made that year of double varieties, large and fringed, and for the first time, the fern-leaved sorts. The first plants figured and carefully observed had the comparatively short, cordate-ovate leaves. Now one appeared as a seedling sport at Finchley, England, having elongated leaves,—since called the fern-leaved type—and typical purplish-crimson flowers. By 1865 red and white flowers were grown on fern-leaved plants, and now all colors known with the palmate (common) form, are to be found in fern-leaved plants. In many strains these fern-leaved types appear about one in every four plants, are *recessives* in Mendelian terms, and will breed true, so that fern-leaved or *filicifolia* strains are advertised. Some of these are very pretty.

And so the variation has gone on, all within the one species, variations not only in color and flower and shape of leaf, but in size, texture, limbriation and overlapping of the corolla lobes; in the size of the yellow eye even to its elimination in some varieties; in the general growth habit of the plant; in the color of the leaves, and in the combination of leaf-color with flower color. Where at first red on the leaves indicated some degree of red in the flower-color, it cannot be depended upon now. Green-leaved plants may bear pink flowers; very dark red leaves are often associated with pure white flowers. So much has been done through selection and cross-breeding of

varieties that within the wide range of the cyanic series, which includes no pure blue nor pure yellow, many different flower-colors and several different combinations of flower- and leaf-color occur, making the Chinese Primrose a most interesting plant from the breeder's view point.

A new chapter in Chinese Primrose history was added when the wild form was discovered in 1886, by Abbé Delavay, a French Jesuit missionary and enthusiastic botanist. As the first Chinese Primroses had been introduced from Chinese gardens, and early had shown considerable variation, botanists and breeders had long been desirous of finding a typical plant in its habitat. Delavay found the plant growing on limestone cliffs in the gorges about Ichang, Ho-Pe, Central China, and sent specimens to M. Franchet of the *Museum d'histoire naturelle*, Paris. Seed was soon sent to England, and the first plant exhibited before the Science Committee of the Royal Horticultural Society in 1891. The new plant was undoubtedly *P. sinensis*, but differed widely from the florists' ideal then in cultivation. Instead of stocky growth and large, fringed, thick-textured flowers in close clusters on stout stems, this newcomer was of very slender growth, with small, long-stalked leaves and slender flower-stems bearing several successive whorls of small smooth-edged, light-pink flowers. The whole plant resembled "reversions" which had occurred now and then among cultivated forms and which had not been considered worthy of cataloging. The breeders tried to cross the new form with cultivated forms. Mr. Green, of Reigate, succeeded, the resulting plant was obtained by Messrs. Cannell of Swanley, Kent, selected and re-selected for a few years and put out in 1894 as "The Lady" Primrose, the most noticeable novelty of the year. This plant had the habit of the wild plants sent by Delavay, but had very dark foliage, stems nearly a purplish-black, and numerous pure white blossoms in whorls on slender stems twelve to eighteen inches in height. It was exhibited before the Royal Horticultural Society in 1895 and attracted much attention.



PRIMULA OBCONICA
A LARGE-FLOWERED GRANDI-
FLORA TYPE

About the same time Messrs. Sutton, of Reading, selected the best forms of the "reversions" which had been carried along in their houses, and catalogued them as "Star Primroses." The popularity of these two forms was immediate in England and America. Popular taste turned from the standard compact type to the new loose type. Soon all colors of flower and leaf known in the old types were to be found in the new. They are graceful, attractive plants, filling a place of their own in conservatory decoration, but not replacing wholly the older types, only adding one more to the many forms that make the genus popular.

The Obconica Primrose

In 1879 Charles Maries, collector in China for James Veitch & Sons, Chelsea, England, sent home seeds of a new primrose which was named by the botanist, Henri F. Hance, *Primula obconica* in reference to the unusual obconic form of the calyx. It flowered in 1880, was exhibited before the Royal Horticultural Society in 1882, and introduced by Veitch that same year. This was a stout, low-growing, branching plant with many, nearly smooth, petioled, ovate-oblong, dark green leaves, and many flower clusters on stiff, upright stems rising well above the foliage. The corolla was pale lilac or purplish in color, with smooth rounded lobes.

This species, to which no satisfactory common name has been given, soon became popular. It is more easily grown than the Chinese Primrose, blooms more abundantly and over a longer period, and is more useful as a cut flower.

As with the Chinese Primrose, variations from the original soon appeared, some in general habit of the plant, some in size, shape and texture of the leaves; more in size and color of the flowers. There are now stocky plants with few stout-stemmed clusters of very large flowers; and more slender plants with numerous clusters of flowers large and small, plain and ruffled. From the early lilac or purplish flowers have been developed flowers of deepening color, to bright violet-red and

almost a good crimson, and in the other extreme to almost pure white. All these have come in as variations within the one species, for so far crossing with other species has not been successful. Double forms also have appeared, but they have not attained to the popularity at one time accorded double Chinese Primroses.

Until very recently the species has been very popular in America—it is better adapted to our conditions; but it has one unfortunate habit. It exudes a sticky substance through the hairs of the leaves and flower-stems which is poisonous to some people—only one in a hundred, one authority has estimated. But this poison, which causes severe irritation for several days and which is not dissolved and washed off with water, has earned for the plant, with some people, the name of the “poison primrose” and has put all primroses in bad repute with indiscriminating persons. For the Chinese Primrose rarely causes irritation and there seem to be almost no authenticated cases of trouble from other primroses; and because *Primula obconica* is poisonous to a few people it is unjust to other species to banish them all as some growers report having done. It should be noted here that the *obconica* poison is soluble in alcohol, and the person who, immediately after handling the plant, washes his hands in alcohol or some preparation with a strong alcoholic base, and then in soap and running water, rarely suffers any inconvenience. But true it is that this beautiful and most useful plant is to-day suffering partial eclipse. The reason, however, is not wholly on account of the poisonous properties; it is also because another beautiful primrose is in some degree surpassing it as a favorite. This is the most recently introduced of the seven species discussed in this paper, the Fairy Primrose. Here is a gem, indeed, not filling all the places occupied by either *P. sinensis* or *P. obconica*, but having a widening and very useful place of its own.

The Fairy Primrose (*Primula malacoides* Franch.), was also discovered by the Abbé Delavay, in 1884. He found it in the Tali Valley, Yunnan, Central China, growing in cultivated fields, in other words—a weed. Eager for new plants, he



FAIRY, PRIMROSE
PRIMULA MALACOIDES

sent it to the Museum at Paris. Franchet described it and named it *malacoides* because of the likeness of its leaves to those of *Erodium malacoides*.

But it was not introduced to trade until more than twenty years later, when George Forrest, collector for Bees, Ltd., of Liverpool, found the plant in the same region in which Delavay had collected it, and sent home seed. Plants flowered in England in 1908, were exhibited by Messrs. Bees before the Royal Horticultural Society, and by 1910 were widespread in British gardens. It was exhibited before the Chicago Florists' Club in 1912 when it created much interest and its usefulness to the American trade was predicted. Our figure well represents the plant, though not a large specimen.

We find abundant foliage, a large tuft of small, long-stalked, bright green leaves, soft and hairy; many very slender flower-stems six to eighteen inches high, bearing three to six or more whorls of small, dainty, mauve-lilac flowers of delightful fragrance. Though small in features, large specimen plants are produced, bearing sixty or more flower-stems at a time.

The plant is of attractive appearance, produces such an abundance of flowers and is so easy of propagation and culture, small wonder that it has rapidly gained in favor. Variation has been rapid. There are stocky, dwarf forms and extra large forms; flowers considerably larger than the original type, and in color from white to deep lilac, and flowers double. Every year sees new types exhibited. Not only is it in a large degree displacing *P. obconica*, but has displaced, to a large extent, its close-related and longer-cultivated species, the Baby Primrose.

The Baby Primrose, (*Primula Forbesii* Franch.) is another species from Yunnan, China, and the Shan States of Eastern Burmah, another weed of cultivated fields, at home in the forest and along the irrigation ditches of the rice fields. And to Abbé Delavay must be credited its discovery, in China, in 1884; and to Franchet of the Museum, Paris, its description, classification and naming. The species name was probably given in honor of Francis Blackwell Forbes who was inter-

ested in Chinese plants. A special interest attaches to this plant, for of our seven it is the only one known to be figured and described in Chinese botanical works. It seems strange that the Chinese Primrose is not so figured, as it was doubtless known and cultivated long before Reeves saw it.

The Abbe sent seed of the Baby Primrose, just when we do not know, but the first plant in Europe was grown by the house of Vilmorin, Paris, in 1890, and exhibited before the Royal Horticultural Society in 1891. It was being grown by American private gardeners in 1893, and listed in at least one catalogue in 1895.

This species, much like the Fairy Primrose already described, was, at the time of its introduction, unlike any other in the trade. It was too unlike the stockier, large-flower *P. sinensis* and *P. obconica* to quickly find favor. One primula critic described it as weedy in appearance. It is small, with small, short-stemmed, slightly bluish-green leaves which are poor in texture, do not well set off the flower clusters, and easily decay under unfavorable conditions. The individual flowers much resemble those of the Fairy Primrose, but are arranged more closely on the strictly upright stems, and are quite heavily coated with a white mealy substance called farina, a feature common to many primroses. They are in color from bright to light lilac and possess a slight fragrance. The people were slow in appreciating its merits, it came to be grown considerably as a pot plant for conservatory decoration and for cut flowers. The dainty sprays are attractive for small basket or vase arrangements, and keep well. The culture also is very easy, and the period between seed-sowing and blooming shorter than for any other primrose used in America.

It has shown but little variation under cultivation, only slight differences in the lilac color of the flowers. It is a worthy species, has a place with winter-flowering plants, but will probably never regain the favor of the trade such as it had before the introduction of the Fairy Primrose.

The remaining three primroses, *P. verticillata*, *P. floribunda* and *P. kewensis*, belong in a closely-related group by them-

selves, far removed from the other already described. A botanist, while noting differences from other primroses, would also quickly observe the relationships—the growth form of the plants, the shape and arrangements of the flowers. The most striking difference is the flower color. Where all the others had red of the cyanic series, not yellows, these have only yellow flowers—yellow, pure and bright to light. The next difference is in the practically stemless leaves, the blade narrowing down until it joins the crown of the plant.

The Abyssinian Primrose, (*Primula verticillata* Forsk.) was discovered, described and named by Petrus Forskal in 1775. He found it in the mountainous region of South-eastern Arabia, and named it *verticillata* because of the whorled or verticillate arrangement of the flowers. We now know this to be a very common arrangement in many primroses, but it was not so apparent among those known at that time.

When viable seed or living plants reached Europe we do not know, but in 1826 M. Otto, of Berlin, sent seed to Dr. Graham in England, who grew plants which flowered in 1828. The plant came into cultivation and probably continued in private collections, but could not have been widely known, for in 1860 Veitch obtained seed from Abyssinia of what seemed to be a new primrose, and which he exhibited before the Royal Horticultural Society in 1870 as *Primula Courtii*, The Abyssinian Primrose. This did vary considerably in size and mealiness from herbarium specimens of *P. verticillata* or *P. Boveana*, as one specimen has been named. But all are now accepted as one species, *P. verticillata*, having natural varieties.

It is a stout, practically stemless, much branching plant, with oblong-lanceolate leaves six to twelve inches long, dentate at the margins. The flower-stems rise twelve to eighteen inches high, bearing many showy leaf bracts and long, tubular, light yellow, sweet-scented-flowers. The whole plant—leaves, flower-stems, bracts and buds—are often coated with farina, giving it a striking appearance. It is a handsome plant and easily grown. Seed is offered by some American firms, yet it does not seem to be used in the trade. A true perennial, it

takes longer to mature than some species, but will flower successfully for several years and make large specimen plants. Perhaps its more limited season of bloom makes it less popular. More likely it has been superseded by the Kew Primrose to be described later.

The Buttercup Primrose (*Primula floribunda* Wall) has also witnessed rise and decline in popularity. It was one of the earlier Asiatic primroses known in Europe, described and figured by Wallich in 1825, and named *floribunda* because of its extreme floriferousness. But it seems not to have been introduced into cultivation to any extent until 1879—"reintroduced" one writer says—though in the long interval garden literature gives no hint that it was being used.

It is a native of the Himalayan region over a wide area from east to west and at widely differing altitudes. The introduction in 1879 was by way of seed sent to the Edinburgh Botanic Gardens by a Mr. Goalen. It was not exhibited before the Royal Horticultural Society until 1886 and was not in general cultivation until after this time. Henry A. Dreer of Philadelphia lists it as new in 1888.

It is a low-growing, branching perennial plant, coming, when old, to have a woody rootstock. It is clothed more or less with hairs and is occasionally mealy. The leaves are ovate or elliptic, about six inches long, coarsely toothed and dull green in color. The flower-stems are numerous, four to eight inches long, bearing many whorls of small, bright yellow flowers. Occasionally one finds a plant with pale primrose-yellow flowers. The plant varies much in the wild, depending on location, whether high or low altitude, moist or dry situation. Its natural variation and its relation to the Kew Primrose have made it the subject of interesting discussion among botanists.

It is a showy, easily-grown plant, popular in America a few years ago when it was advertised quite widely as a new species. But this was only a large-flowered type. Seed is offered by a few seedsmen, but the plant is not used in the trade now to any extent.

But the yellow primrose that has probably supplanted both *P. verticillata* and *P. floribunda* is the Kew Primrose (*Primula kewensis* W. Wats.). Here we have not a true species, but a type, originating at Kew Gardens, England, in 1898. Who shall venture to decide when eminent botanists disagree? The growers at Kew believe it to be a hybrid between *P. verticillata* and *P. floribunda*. It appeared in a batch of *P. floribunda* seedlings, the parents of which had been grown in close proximity to plants of *P. verticillata*. It did not produce seed for several years; acted in this respect as a true hybrid was then supposed to act. Since then it has remained fairly true to type. On the other hand, other botanists have pointed out the wide differences in *P. floribunda* in the wild and how near some forms approach to *P. kewensis*; believe that *P. kewensis* is only a form of *P. floribunda*, a seedling sport, uncommon under cultivation, but closely approached in the wild. Hence its apparent fixity of type, such as no true hybrid would show. Only wider observation and much careful experimentation will prove the truth.

The Kew Primrose is a handsome plant, large, practically stemless, devoid of hairs, sometimes quite mealy and at other times almost wholly lacking in meal. The leaves may reach a length of thirteen inches and a breadth of four inches. The flower stems are erect, reddish, twelve inches or more in height, bearing showy, leafy bracts and several whorls of bright to slightly deeper yellow flowers of good size, almost as large as those of *P. obconica*, and of slight fragrance.

The plant is easily grown, free-flowering and comes into flower when comparatively young. Its best blooming time is late winter and early spring as is also the habit of *P. verticillata* and *P. floribunda*. While not listed by wholesale plant growers, it is not infrequently seen at exhibitions and is a valuable pot plant where yellow is desired to brighten the greenhouse and conservatory.

Culture

Most primulas, in the wild, grow in mountainous regions. Though some, as *P. Forbesii* and *P. malacoides*, are plants of the valleys, more are found on the mountain sides, growing among rocks, their roots penetrating the crevices where the scanty soil is composed of loose rock debris and the accumulation of decaying plant remains. Though some are found in exposed situations and others in sheltered nooks, all have cool, moist, well-drained ranges for their roots, a light soil and a cool atmosphere. To keep these conditions in mind will bring greatest success in growing the plants. Hence a soil made light and open by some sand and plenty of leaf-mold, a cool, pure atmosphere, plenty of moisture at the roots and good drainage are what one should furnish.

Primula seed is fine and care should be used in handling. Obtain fresh seed if possible, as it does not long remain viable. Sow in fine soil composed largely of fibrous material—peat or leaf-mold—in shallow pans. Cover lightly or not at all, place a pane of glass over the pan, shade and keep moist in a temperature of about 55° to 60°. Different species vary somewhat in time of germination, but age of the seed has more to do with irregularities. Transplant into flats or small pots when ready to handle; if not sown too thickly this will be when the second pair of leaves has partly developed. Though the soil may be slightly different for different species when mature, during their younger stages a finely screened medium loam having a large proportion of leaf-mold will favor growth. The roots are very fine and much branched and cannot accommodate themselves to heavy soils. *P. obconica*, *P. malacoides* and probably *P. Forbesii* can thrive in slightly heavier soil than the others. As good drainage is always essential to the health of primulas, to use an abundance of "crock" or charcoal in the bottom of three inch pots and larger is helpful. The shifts should be made only when the plants show by root-development that they need them. When shifted to four inch pots or larger, very well-decayed manure and a little bone meal may



KEW PRIMROSE
PRIMULA KEWENSIS

be added to the soil. *P. sinensis*, growing wild on limestone cliffs, is benefited by adding a little lime or old mortar rubble to the soil. Many species are benefited by small doses of weak liquid manure when forming buds and throughout the blooming period, but much care should be used in applying not to get it on the foliage.

Care should be used not to wet the foliage to any extent when watering the plants, especially not to pour water into the crown. The hairy leaves and stems of some kinds, and the broadened petiole bases of most kinds, prevent rapid drying out and frequently a rot develops which injures or destroys the whole plant. Spraying also washes off the farina of *P. verticillata* and *P. kewensis*. Spray the other kinds if necessary to wash off the soot and dust. Do this on bright days and in the morning to allow time to dry off before night. Use care in watering not to wet the foliage and never over-water. More can be done for the health of the plants by a proper control of the atmospheric moisture, which should be abundant but not stagnant. Give much fresh air.

As primulas come from cool regions, and many are alpine plants, they should not be subjected to forcing in warm houses, to strong sunlight, nor to dry air. High temperatures produce weak, spindling plants whose poor flowers do not develop nor keep well. Strong light fades the foliage and the darker colored flowers, especially rich reds and blues. Too dry air, especially if combined with too high temperatures, very soon withers the flowers. For *P. sinensis* a temperature of 45° to 50° has been found admirable. Some have most success in giving 40° until the blooming period, then about 50°. *P. obconica* and *P. malacoides* do better in slightly higher (10°) temperature and can withstand a drier atmosphere though the flowers do not last as long. The same treatment seems to suit the yellow-flowered group though their requirements have not been as carefully worked out. *P. Forbesii* probably does better in a little lower temperature than these last. Fairly good specimens of primulas can be grown in living rooms if grown there from early life and if some thought is given to their

special needs; but disappointment is often the lot of those who bring specimens from greenhouses to ornament their homes. These plants cannot readily adapt themselves; the flowers fade rapidly and healthy growth ceases. People discard primroses when a little better understanding of their needs would result more fortunately.

Though all these plants can be made to flower for more than one season, and for large specimen plants of *P. sinensis*, double, *P. obconica*, *P. verticillata* and *P. kewensis* more than one season is required, all are better treated as annuals, sowing seed each year. The time for sowing will vary considerably. *P. sinensis* may be flowered from November until early spring. Allow about seven months to produce good plants and sow seed accordingly. Most growers raise a succession of plants. *P. obconica* continues to flower in good condition over a much longer period, but needs about seven months to mature. The yellow-flowered group bloom best in late winter and early spring, and should have a period longer than seven months in which to mature, *P. verticillata* probably needing the longest of all. *P. Forbesii* and *P. malacoides* are practically annuals in the wild, hence mature more quickly than the others. Fine specimens of the former may be had in four to five months from seed sowing, and of the latter in five to seven months. Best success attends those who do not attempt to grow too large plants of these last two species. Rotting of the stem often occurs. Sow seed in late summer, or if large plants are grown too early, divide into sections, repot, and give a chance to grow on again.

All these primulas may be grown from cuttings (where the branches occur well above the ground) or by division of the crown (where the plants are practically stemless and stool out at the surface of the soil). While these processes are profitable for *P. Forbesii* and *P. malacoides*, they are not used to any extent with the other species except to perpetuate choice kinds as of the double *P. sinensis* that never or rarely produces seed.

True primula diseases are almost unknown. The leaf and crown rot which frequently appears is due to faulty manage-



BUTTERCUP PRIMROSE
PRIMULA FLORIBUNDA

ment—over-feeding, careless watering, poor ventilation. Insect enemies are few and easily controlled if cared for when they first appear. Green aphids may attack some species if grown in badly infested houses. White fly on *P. obconica* is the only insect really troublesome. This infests the under sides of the leaves, sucking out the juices. When once established it is difficult to exterminate without injury to the plant. Use potassium cyanide in light doses, or strong nicotine sprays or fumigations in repeated applications until the pests are removed.

So here are seven attractive winter-and-spring-flowering plants, easily obtainable, easy of culture, of long blooming season compared with any popular bulb and many other popular plants, of bright colors in wide ranges, of pleasing fragrance. They are most useful in conservatories and small private greenhouses, can be used as house plants under favorable conditions and several are handled in the trade by thousands, sold as pot plants, used in making up plant baskets and some kinds used for cut flowers.

As a list of species now grown in American greenhouses and offered for sale, this is not complete. Several hardy species, associated primarily with gardens, are now forced for early spring bloom and are gaining in favor. And many more are waiting to be tried out. Appreciation will come with knowledge. If those who now successfully grow any kind of primrose will contribute their knowledge we shall soon have in this country and for our conditions, which are different from those obtaining in England where so many species are now grown, a fund of information which will make possible the growing and enjoyment of many more species of this attractive genus.

Cornell University.

The Spring Flower Show at Grand Central Palace, New York



TO THOSE who had argued that a Flower Show in war times was a doubtful expedient the great show held from March 14 to the 21st came as a distinct surprise. For not only was it a success, it admirably illustrated that the commercial and private growers were able in spite of the coal shortage and transportation difficulties to get together a show in every way a credit to the enterprise. While it is true that there were not so many built up "set pieces" as in previous years, those that were shown were quite up to standard. The plant group exhibited by Mrs. H. Darlington of Mamaroneck, occupying a large area on the floor, and beautifully stocked was one of the chief attractions of the show. It reflected great credit upon the gardener, Mr. P. W. Popp. Other large groups were by R. M. Johnston of Yonkers and J. W. Smith of Ridgefield, Conn.

The coöperation of the American Rose Society, whose 1918 *American Rose Annual* has just been issued, helped to make the rose exhibits a notable feature of the show. Two rose gardens by A. N. Pierson and F. R. Pierson, both awarded gold medals, were better than any that have been seen before. The former was a beautiful garden, with turf and gravel paths setting off the beds, and enclosed by a rustic fence over which scrambled the new rambler rose Rosiere. Many splendid exhibits of individual varieties of roses were shown and some of these are described by Mr. Charles H. Totty in this issue of the JOURNAL.



PRIZE WINNING
DUTCH BULB GARDEN,
JOHN SCHEEPER'S AND CO

To the general public perhaps the most taking exhibit was a model vegetable "war garden" shown by Mr. George J. Gould of Lakewood. This was 25 by 36 feet and had over twenty varieties of vegetables in healthy luxuriance. Set off by a neat picket fence, the trim appearance of this little edition of what nearly all of us are doing by this time, made an instant appeal.

The more horticulturally minded would be attracted to the Bulb Garden of John Scheepers & Co. easily the best all round exhibit of the show. It won all the prizes offered for its class, including the cup offered by the International Garden Club for the best exhibit in the show. The garden was divided into several sections, the chief place being given to tulips, about six thousand of Primrose Beauty, and similar amounts of Prosperity and Flamingo. There were also many other bulbous plants shown, notably Hyacinths, *Triteleia*, *Bulbocodium*, Narcissus, and others. The illustration herewith gives an idea of the general effect of this really notable exhibit.

There were many smaller exhibits, some of them of particular interest to fanciers, and among individual plants in flower was one of *Amorphophallus Riversii*, not usually seen outside of botanic gardens. The Park Departments of Manhattan and Brooklyn had large exhibits and for the first time the Brooklyn Botanic Garden entered an exhibit consisting of rare or interesting plants that attracted attention, especially because all the plants were distinctly labelled. In all shows open to the general public this is a feature that many exhibitors do not give as much attention as it deserves.

As before, the show was held under the auspices of the New York Florists Club and the Horticultural Society of New York. To Mr. Arthur Herrington who managed the show, and to all those who contributed to its success, the first war-time Flower Show must be a genuine satisfaction. A list of the prize-winners is printed below:

PRIVATE GROWERS' SECTION

Plants in Flower

Specimen Acacia—1st, Mrs. F. A. Constable, Mamaroneck, N. Y., gard. James Stuart; 2d, Mrs. H. Darlington, Mamaroneck, N. Y., gard. P. W. Popp.

Twenty-five Amaryllis—Mrs. F. A. Constable.

Twelve Amaryllis—1st, Mrs. F. A. Constable; 2d, Mrs. Eugene S. Meyer, Mt. Kisco, N. Y., gard. Alex. Thomson; 3d, Mrs. Chas. Bradley, Convent Station, N. J., gard. David Francis.

Specimen Azalea—James A. MacDonald, Flushing, N. Y., gard. R. Hughes.

Twenty-five Cyclamen—F. E. Lewis, Ridgefield, Conn., gard. J. W. Smith.

Twelve Cyclamen—F. E. Lewis.

Specimen Chorizema—F. E. Lewis.

Specimen Erica—F. E. Lewis.

Group of Primulas—1st, Mrs. Payne Whitney, Manhasset, N. Y., gard. George Ferguson; 2d, Col. H. H. Rogers, Tuxedo Park, N. Y., gard. Jas. Ventale.

Six Astilbe—B. H. Borden, Oceanic, N. J., gard. Wm. Turner.

Flowering plants and bulbs covering 400 sq. ft., arranged as a garden—Mrs. H. Darlington.

Palms and Foliage Plants

Specimen Areca lutescens—Mrs. F. A. Constable.

Twelve Crotons—F. E. Lewis.

Specimen Kentia Forsteriana—Mrs. F. A. Constable.

Phoenix Roebelenii—Mrs. F. A. Constable.

Specimen Palm, single or bushy—Mrs. F. A. Constable.

Group of flowering and foliage plants, 100 sq. ft.—F. E. Lewis.

Ferns

Specimen Adiantum—James A. MacDonald, Flushing, N. Y.

Specimen Cibotium Schiedii—Mrs. F. A. Constable.

Fern, any other variety—1st, Col. H. H. Rogers; 2d, Mrs. Payne Whitney.

Bulbous Plants

Lilies, 12 pots—Mrs. F. A. Constable.

Bulbs in bloom, arranged as a garden, 200 sq. ft.—1st, Mrs. Payne Whitney; 2d, Mrs. H. Darlington.

Bulbs in bloom, 100 sq. ft.—1st, Mrs. Payne Whitney; 2d, Mrs. H. Darlington.

Bulbs in bloom, 50 sq. ft.—1st, Mrs. Payne Whitney; 2d, B. H. Borden.

Pan of Darwin tulips, "Prof. Rowenhoff"—1st, Mrs. Payne Whitney; 2d, Percy Chubb, Glen Cove, N. Y., gard. Robert Jones.

Pan of Darwin tulips, "Sir Trevor Lawrence"—Percy Chubb.

Orchid Plants

Group, 100 sq. ft., arranged for effect—Arthur N. Cooley, Pittsfield, Mass., gard. Oliver Lines.

Group, 25 sq. ft.—1st, Mrs. F. A. Constable; 2d, Col. H. H. Rogers.

Six plants—Col. H. H. Rogers.

Three plants—Col. H. H. Rogers.

Cattleya, Laelia or Laelia-Cattleya Hybrids—1st, Col. H. H. Rogers; 2d, F. E. Lewis.

Specimen—1st, Col. H. H. Rogers; 2d, B. H. Borden.

Miscellaneous Cut Flowers

Twenty-five spikes Antirrhinum—Percy Chubb, Glen Cove, N. Y.

Twelve spikes Mignonette—1st, Percy Chubb; 2d, Mrs. M. F. Plant, Groton, Ct., gard. E. Robinson.

Twelve spikes Stocks—1st, Percy Chubb; 2d, Col. H. H. Rogers.

Two hundred Violets—1st, Percy Chubb; 2d, Peter Hauck, East Orange, N. J.

Twelve spikes Wal flower—1st, Percy Chubb; 2d, Mrs. E. S. Meyer.

Cut Roses

Eighteen Hadley—Mrs. F. A. Constable.

Eighteen Radiance—Jas. A. MacDonald.

Eighteen Ophelia—Mrs. F. A. Constable.

Vase of 25 Roses—1st, Joseph E. Widener, Ogontz, Pa., gard. Wm. Kleinheinz; 2d, Mrs. P. Boettger, Riverdale, N. Y., gard. Hans Schrosey.

Carnations

Twenty-five white—Mrs. F. A. Constable, with Matchless; 2d, Mrs. M. F. Plant.

Twenty-five flesh pink—1st, B. H. Borden; 2, Mrs. M. F. Plant.

Twenty-five light pink—1st, Mrs. F. A. Constable, with Good Cheer; 2d, Peter Hauck.

Twenty-five dark pink—1st, Percy Chubb; 2d, B. H. Borden.

Twenty-five red—1st, J. D. Crimmins Estate, Noroton, Ct., gard. A. P. Wezel; 2d, B. H. Borden.

Twenty-five crimson—1st, Mrs. E. S. Meyer; 2d, B. H. Borden.

Twenty-five white variegated—1st, Mrs. Chas. Bradley, Convent, N. J., gard. David Francis; 2d, Mrs. M. F. Plant.

Twenty-five yellow—Mrs. Payne Whitney.

Twenty-five any other color—1st, Mrs. M. F. Plant; 2d, Mrs. Payne Whitney.

Vase of carnations, 150 blooms—1st Percy Chubb; 2d, Mrs. Payne Whitney.

Table Decorations

Dinner table decoration of orchids staged Saturday, March 16—1st, Thos. Aitchison, Mamaroneck, N. Y.; 2d, Mrs. P. Boettger. Both beautiful examples of refined taste in arrangement.

Basket of flowers, for Max Schling medals—1st, Mrs. M. F. Plant; 2d, Mrs. H. Darlington.

Table Decorations staged Tuesday, March 19. There were seven entries in this competition. All were meritorious and the judges had a close call. They were as follows:

Thomas Aitchison, Mamaroneck, N. Y., a very graceful and delicate arrangement of *Streptosolon Jamesonii* and nasturtiums, 1st; R. J. Carey, Florham Farms, Madison, N. J., *Ophelia* roses and *Adiantum Farleyense*, 2d; Hans Schrosey, Riverdale, N. Y., nasturtiums only; George Ferguson, Manhasset, annual larkspurs, very simple and dainty; Sam. Goldring, gard. for Mrs. Ridley Watts, Morristown, N. J., pink roses; P. W. Popp, Mamaroneck, N. Y., *Acacia pubescens* and *ranunculuses*; David Francis, Convent Station, N. J., anemones.

Sweet Peas

Staged Wednesday, March 20th.

Display, 25 sq. ft.—1st, F. E. Lewis; 2d, W. R. Coe, Oyster Bay, N. Y. Collection, six varieties—1st F. E. Lewis; 2d, W. R. Coe.

One hundred sprays—1st, W. R. Coe; 2d, Peter Hauck.

Dinner Table Decorations

Staged Wednesday, March 20

Dinner table, sweet peas—1st, R. J. Carey, Madison, N. J.; 2d, Mrs. Chas. Bradley, Convent, N. J.; 3d, Thos. Aitchison, Mamaroneck, N. Y.

COMMERCIAL GROWERS' SECTION

Plants in Flower

Collection of Hydrangeas, 150 sq. ft.—Fred H. Dressel, Weehawken, N. J.

Six Hydrangeas—Fred H. Dressel.

Six Marguerites—Madsen & Christensen, Wood Ridge N. J.

Specimen Marguerite—1st, Madsen & Christensen, Wood Ridge, N. J.; 2d, Bobbink & Atkins, Rutherford, N. J.

Flowering and foliage, stove and greenhouse plants, 300 sq. ft., arranged for effect—A. N. Pierson, Inc., Cromwell, Ct.

Borden planting, Evergreens, Forced shrubs, Herbaceous plants, Bulbs or any other hardy stock, 10 x 40 ft. (1st prize, \$500, 2d prize \$300)—1st, F. R. Pierson, Tarrytown, N. Y.; 2d, Bobbink & Atkins.

Rock garden, 10 x 30 ft., Bobbink & Atkins

Palms and Foliage Plants

Specimen Kentia Belmoreana—1st and 2d, M. Mutillod, Secaucus, N. J.
Kentia Forsteriana—1st, Julius Roehrs Co., Rutherford, N. J.; 2d, M. Mutillod.

Phoenix Roebelinii—1st and 2d, M. Mutillod.

Other specimen Palm—M. Mutillod.

Trained Ivies—Bobbink & Atkins.

Ferns

Six Adiantum Farleyense or its types—A. N. Pierson, Inc.

Specimen Adiantum Farleyense—A. N. Pierson, Inc.

Specimen Adiantum cuneatum or its types—F. R. Pierson.

Specimen Nephrolepis exaltata Bostoniensis—F. R. Pierson.

Specimen Cibotium Schiedii—F. R. Pierson.

Specimen Nephrolepis, any other variety—F. R. Pierson.

Nephrolepis in variety—F. R. Pierson.

Specimen Fern—F. R. Pierson.

Bulbous Plants

Ten pans Lily of the Valley—Wm. H. Siebrecht, Astoria, L. I.
 Bulb garden, 500 sq. ft. (Special open class)—John Scheepers & Co.,
 New York City.

Orchids

Group, 200 sq. ft., arranged for effect—1st, Julius Roehrs Co.; 2d, Lager
 & Hurrell, Summit, N. J.

Cut Orchids, 50 sq. ft.—Joseph A. Manda, West Orange, N. J.

Cut Roses

One hundred American Beauty—1st, L. A. Noe, Madison, N. J.; 2d,
 F. R. Pierson Co., Tarrytown, N. Y.

One hundred Mrs. Charles Russell—1st, Duckham-Pierson Co., Madi-
 son, N. J.; 2d, F. R. Pierson Co.

One hundred Ophelia—1st, Duckham-Pierson Co.; 2d, A. N. Pierson,
 Inc., Cromwell, Ct.

One hundred Mrs. George Shawyer—A. N. Pierson, Inc.

One hundred Francis Scott Key—F. R. Pierson Co.

One hundred Pink Killarney—1st, F. R. Pierson Co.; 2d, A. N. Pierson,
 Inc.

One hundred White Killarney—1st, A. N. Pierson, Inc.; 2d, F. R.
 Pierson Co.

One hundred Hadley—Joseph Heacock Co., Wyncote, Pa.

One hundred Richmond—F. R. Pierson Co.

One hundred Sunburst—F. R. Pierson Co.

One hundred Hoosier Beauty—1st, F. R. Pierson Co.; 2d, Duckham-
 Pierson Co.

Fifty Mrs. Aaron Ward—1st, Duckham-Pierson Co.; 2d, A. N. Pierson,
 Inc.

Fifty any other pink—1st L. B. Coddington, Murray Hill, N. J.; 2d,
 A. N. Pierson, Inc.

Fifty any other yellow—A. N. Pierson, Inc.

Fifty Lady Alice Stanley—1st, Albert Jackson, West Summit, N. J.;
 2d, John Welsh Young, Philadelphia, Pa.

Twenty-five any undisseminated variety—E. G. Hill Co., Richmond,
 Ind., silver medal for Columbia, exhibited by Chas. H. Totty.

Fifty red rose, not yet disseminated—A. N. Pierson, Inc.

Carnations

One hundred white—Chas. H. Totty, Madison, N. J., with Matchless.

One hundred flesh pink—1st, Gude Bros. Co., Washington, D. C., with Cottage Maid; 2d, Chas. H. Totty.

One hundred dark pink—1st, Chas. H. Totty, with Good Cheer; 2d, G. F. Neipp, Chatham, N. J.

One hundred red—1st, Chas. H. Totty, with Belle Washburn; 2d, M. Matheron, Hempstead, N. Y.

One hundred white variegated—1st, Chas. H. Totty, with sport from Miller; 2d, Scott Bros., Elmsford, N. Y.

One hundred yellow—Chas. H. Totty, with Yellow Prince.

Fifty any new variety not in commerce—1st, Gude Bros. Co., with flesh pink seedling; 2d, Sam J. Goddard, Framingham, Mass., with Laddie.

Table Decorations

Table Decoration, Competition limited to hotel men only, staged Friday, March 15th, and renewed daily, Hotel Chatham, New York, silver cup. Arranged by Alfred Bunyard.

Sweet Peas

Staged Wednesday, March 20

One hundred sprays bicolor—1st, S. Van Riper, Dundee Lake, N. J.; 2d, M. Matheron, Hempstead, N. Y.

100 white—1st, Clarence Slinn, New York; 2d, M. Matheron.

100 lavender—1st, S. Van Riper; 2d, M. Graff, Elmsford, N. Y.

100 pink—1st, John H. Thompson, Kennett Sq., Pa.; 2d, S. Van Riper. Display, 100 sq. ft., arranged for effect—W. Atlee Burpee Co.

In addition to these the following special prizes were awarded by the judges:

Gold medals to W. B. Thompson, Yonkers, N. Y., gard. R. M. Johnston, for display of crotons; Arthur N. Cooley, Pittsfield, Mass., gard. Oliver Lines, for *Cattleya Olympus*, *Laelia-cattleya* Mrs. Temple, *Brasso-cattleya Cliftonii*, *Cattleya* Gen. Maude and *Brasso-Cattleya Lemanii*; Wm. H. Siebrecht, Chappaqua, N. Y., *Acadia pubescens* arranged as a bower by Kottmiller; Julius Roehrs Co., Rutherford, N. J., for group of 40 plants of *Cypripedium Maudiae magnifica*; George Gould, Lakewood, N. J., for

model vegetable garden; John Scheepers, New York, for display of flowering bulbs; M. Mutillod, Secaucus, N. J., for pair of specimen *Acubas*.

Silver medals to Mrs. Eugene Meyer, Mt. Kisco, N. Y., gard. *Alex. Thomson*, for *Gerbera Jamesonii* hybrids; Fred H. Dressel, Weehawken, N. J., for group of new fern *President Wilson*; A. N. Pierson, Cromwell, Conn., for new fern *Adiantum Glory of Lemkesii*, also for Double White Killarney roses; Mrs. M. G. Plant, Groton, Conn., gard. *James Ventale*, for basket of callas; A. N. Cooley, Pittsfield, Mass., for *Cattleya Snow Queen*; Valentine Burgevin, Kingston, N. Y., for specimen *pelargonium*; Julius Roehrs Co., Rutherford, N. J., for new hybrid *Cymbidiums Gottianum*, *Pauwelsianum*, *Alexandria* and *Schelegelii*.

Silver cup to M. Mutillod, Secaucus, N. J., for group of miscellaneous plants.

Certificate of merit to Joseph A. Manda, South Orange, N. J. for *Cattleya Schroderae* Mrs. H. Lutch.

First prizes to Bobbink & Atkins, Rutherford, N. J., for standard pyramidal and columnar bay trees; Harold A. Ryan, Cambridge, Mass., for *Strelitzia regina*, and Miss Charlotte Trimm, New York, for African lily.

International Garden Club Sweepstakes Cup, awarded to John Scheepers for "most meritorius exhibit."

Plant Immigrants

The office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry publishes a list, under the above name, of recently imported plants, many of which are valuable to the gardener, from a decorative or economic standpoint. Through the courtesy of Mr. David Fairchild, who is in charge of this work, we are enabled to reprint notes on such plants as have particular interest to our readers. To all who can demonstrate their fitness to care for these recent introductions, the office of Foreign Seed and Plant Introduction will send what is available. Recipients of such material, which often requires considerable skill in handling, obligate themselves to report, when requested, as to what the result of their observations has been. It is essential that the numbers assigned by the Office should be firmly attached to the plant. By this the government gets data on hardiness of the new introductions, and the growers have an opportunity for the observation, first hand, of plants that may prove important. Applications for or letters about these plants should not be sent to the Editor but to Mr. David Fairchild, Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, Washington, D. C.



RASSICA PEKINENSIS (Lour.) Skeels. 44291.

Chinese cabbage seeds from Ansuhsien, Chihli province, China. Collected by Mr. Frank N. Meyer, January 18, 1917. "*Pan ch'ing pan pai pai ts'ai*, meaning 'Half green, half white pai ts'ai,' or 'cabbage' on account of the outer leaves being green while the center is white. A fine quality of heavy winter *pai ts'ai*, coming from a locality famous for its cabbages, and formerly supplying the Imperial Court at Peking. This *pai ts'ai* has a sweet, wholesome flavor, quite juicy, but not watery like most other varieties. After having been boiled once it can be warmed up again three successive days without losing its fine taste. The plants are transplanted three times before being put in their places. They need rich, porous soil and plenty of water while growing fast. In good seasons specimens are obtained that weigh between 30 and 40 pounds each."

CEANOTHUS HYBRIDUS Hort. 44419-44420. One plant of each number from Elstree, Herts, England. Presented by

Hon. Vicary Gibbs, through Mr. E. Beckett, The Gardens, Aldenham House. 44419. Var. *Gloire de Versailles*. Large bright blue panicles of flowers. 44420. Var. *Perle Rose*. Beautiful pink flowers.

CHRYSANTHEMUM INDICUM L. 44287. *Chrysanthemum* seeds from Malanyü, Chihli province, China. Collected by Mr. Frank N. Meyer, November 30, 1916. "A wild, perennial *Chrysanthemum* producing masses of small, golden-yellow flowers late in the fall. The plant is well worth growing in dry banks and in large rockeries. It does best in partial shade. Deserves to be naturalized in a locality like Colorado Springs."

CORYLUS AVELLANA L. 44350-44356. *Filbert* plants from Maidstone, England. Purchased from George Bunyard & Co., Ltd. Seven of the best cultivated filbert varieties of England for trial in the eastern United States where filbert growing has been hitherto considered unsuccessful. Recent experiments in Maryland have given such results that experiments should be continued with this valuable nut of which a great many thousand bushels are annually imported.

COTONEASTER SALICIFOLIA FLOCCOSA Rehder & Wilson. 4422. One plant from Elstree, Herts, England. Presented by Hon. Vicary Gibbs, through Mr. E. Beckett, The Gardens, Aldenham House. A half-evergreen shrub from western China, up to 15 feet high, with oblong to lance-oblong bright green leaves; white flowers in dense corymbs; and 3-seeded, bright red fruits nearly one-half inch in diameter. The value of this shrub lies in the ornamental effect of the bright red fruits in autumn.

MALUS BACCATA (L.) Moench. 44283. *Crabapple* seeds from Peking, China. Collected by Mr. Frank N. Meyer, December 15, 1916. *Hai tan kuo*, meaning Sea red fruit. A medium-sized crabapple, of bright red color and of pleasant sour taste. Calyx deciduous; peduncle medium long. Much used in the north of China as a preserve. This variety seems to be able to stand considerable drought and alkali, and might be of value in breeding experiments in the Upper Mississippi valley.

POPULUS SZECHUANICA Schneider. 44424. A *poplar* from Elstree, Herts. Presented by Hon. Vicary Gibbs, through Mr. E. Beckett, The Gardens, Aldenham House. A common tree in the forests of Szechwan, China, growing to a large size, with massive branches and stout branchlets. It has very large, ovate-elongated or rounded leaves. It is hardy in the north-eastern United States.

PRUNUS SERRULATA Lindley. 42296-44311. Cuttings from Yokohama, Japan. Japanese flowering cherries. Scions of 16 varieties of cherries including some of the most beautiful forms.

PYRUS CALLERYANA Dacaisne. (Malaceae.) 44333. Grafts of a *wild pear* from Hongkong, China. Presented by Mr. W. J. Tutcher, Superintendent, Botanical and Forestry Department. This wild Chinese pear is not uncommon in western Hupeh at an altitude of from 1000 to 1500 m. and is easily recognizable by its comparatively small, crenate leaves and small flowers. This pear maintains a vigorous and healthy appearance under the most trying conditions, and might prove to be a very desirable blight-resistant stock. The woolly aphid, which attacks other species of pears, has not been known to touch this species.

PYRUS SP. (Malaceae.) 44246. *Pear* scions from Charles City, Iowa. Presented by Mr. Charles G. Patten. "In Grundy Center, Iowa, there is a pear tree growing which endured the extremely cold winter of 1883, 1884 and 1885. This pear is owned by Mr. O. A. Bardhall, a tailor, and was imported from China as a Chinese Sand pear by Mr. John S. Collins & Sons of New Jersey, and was supposed by them to bear pears nearly the size of *Flemish Beauty*, but only of cooking quality. The extreme hardiness of the tree appealed to Mr. C. G. Patten of Charles City, Iowa, who planted one in his orchard in 1885, and the following year planted two in an isolated orchard on his farm. The second year after that, the tree bore fruit, but on account of its early blooming and consequent lack of pollination bore only a very scanty number of very small, green-colored, hard pears, from which but few seeds were saved.

RAPHANUS SATIVUS L. 44293. *Radish* seeds from Ansuhsien, Chihli province, China. Collected by Mr. Frank N. Meyer, January 18, 1917. "*Teng lung hung lo po*, meaning 'Lantern red root,' referring to the resemblance of the root to a Chinese or Japanese flat lantern. A large, flat, red, winter radish, said to grow as heavy as 5 catties (7 pounds) each. Needs rich, well-drained soil to do well. Sow out in summer, not in spring." (Meyer.)

ROSA OMEIENSIS Rolfe. 44400. A plant from Elstree, Herts, England. Presented by Hon. Vicary Gibbs, through Mr. E. Beckett, The Gardens, Aldenham House. A stout, branched shrubby rose, from 3 to 10 feet high, with the young shoots covered with dense bristles, and the older stems armed with stout, straight thorns. The long, green leaves are composed of 9 to 13 sharply serrate leaflets, and the white flowers, which are over an inch in diameter, occur singly on short lateral twigs. The bright red fruits are up to one-half inch in length, and their yellow stalks are very striking in autumn. These fruits are said to be eaten in China, where the plant grows at elevations of from 8000 to 9500 feet. It thrives in good loamy soil, and may be propagated from the freely produced seeds.

STYRAX WILSONII Rehder. 44403. One plant from Elstree, Herts, England. Presented by Hon. Vicary Gibbs, through Mr. E. Beckett, The Gardens, Aldenham House. A very pretty, small, compact, Chinese shrub with alternate, oval, irregularly dentate leaves, up to $\frac{2}{3}$ inch long; white flowers in axillary and terminal racemes, appearing when the plant is but a few inches high and two or three years old; and gray, velvety, roundish fruits, about $\frac{1}{3}$ inch long. It is best propagated by seeds, although layering may be used. On one occasion, in the nursery at Kew, England, this shrub withstood a temperature of 12°F.

ULMUS PARVIFOLIA Jacquin. 44286. Seeds of *elm* from Chihtaoyin, Chihli province, China. Collected by Mr. Frank N. Meyer, December 1, 1916. "An autumn-flowering elm, found in a locality farther north than one generally meets with this species."

Book Reviews

Landscape Gardening as Applied to Home Decoration. BY SAMUEL T. MAYNARD. (338 pages; 165 illus., John Wiley & Sons, New York. 1915. 2nd ed. Price \$1.50)

The second edition of this book "revised and brought up to date" follows much the same plan as the first edition with considerable addition of subject matter and illustrations. In its first edition this book set a new standard for landscape gardening as applied to home decoration and has long occupied a place almost by itself, as a manual of planting instructions for the use of decorative plant material by nurserymen and owners of home grounds, replacing such books as *Practical Landscape Gardening* by G. M. Kern (1855), and *Ornamental Gardens for Americans* by Elias A. Long (1885).

In addition to the several chapters on selection, arrangement and care of plant material for home grounds, the author discusses briefly such phases of landscape gardening as parks, public squares, school yards, farm places, roads and road-side planting. The material presented in the book as a whole is carefully selected and gives to the home owner many helpful suggestions not only in the use of plant material but in fostering a certain outside interest in landscape problems that is sure to be of much value to him by increasing his interest in both town and country beautification as a whole. The many illustrations of plant material and suggested arrangements serve their purpose well but the material is hardly an aid in identification and often presupposes a knowledge of the plants. Emphasis throughout the book is placed on "decorative" plant material rather than material of special value for mass and group value. If the many excellent lists of plants as to their use and horticultural values had been grouped together they would have been more useful as a ready reference.

R. R. ROOT.

Manual of Fruit Diseases. BY L. R. HESLER AND H. H. WHETZEL (462 pp. The Macmillan Co. 1917. Price—\$2.00)

In this book the authors aim to present all the known facts concerning the common diseases of fruits. While it is prepared primarily for the fruit grower, it may also be used as a reference book by all interested in

plant diseases. The importance of a knowledge of the cause of the disease at hand is emphasized. Then, too, its history, where it originated, with what rapidity the disease organism spreads, the losses of which it is capable, and under what conditions the most destructive outbreaks occur are claimed to be of vital interest to the progressive fruit grower. The attempt is made, with a gratifying degree of success, to compile such information relating to fruit diseases. In addition valuable control measures are suggested in the treatment of each disease. The grouping plan is followed in arranging the contents of the book with the diseases of the various fruits treated alphabetically by host from apple to strawberry, including the common tree and small fruits. None of the diseases common to members of the citrus group, such as oranges and lemons, however, are included, though the title does not indicate the omission. The attempt has been made to discuss the various diseases under each host in the order of their importance, though obviously there are difficulties in the execution of such a plan. The illustrations used serve in some cases to make for a clearer understanding of the written description, while in others they appear to be of doubtful value. The concluding chapter is devoted to a general discussion of fungicides, with directions for their preparation and application, including a comparison of the use of liquid and dust in disease control. While such a chapter is strictly up-to-date at the time of writing, new experimental evidence coming to hand from day to day often overturns common present practices. This is a field well covered by experiment station bulletins, whose results and consequent recommendations apply especially to the state where publication is made. One of the most valuable features of the book is the comprehensive reference list appended to the discussion of each disease, as well as to the chapter on fungicides. A list of reference books and journals dealing more or less with fruit diseases is included in the appendix. In an attempt to make clear the meaning of certain technical terms not common to the farmers' vocabulary, but the use of which, according to the authors, is necessary to a proper understanding of the disease and its control, an excellent glossary is appended. Viewed as a whole, it is believed that the *Manual* will be found extremely useful as a convenient and trustworthy source of information on diseases to the horticulturists.—A. S. COLBY.

How to Lay Out Suburban Home Grounds. BY HERBERT J. KELLAWAY.
(134 pp. John Wiley & Sons, second edition, enlarged.) Price \$2.00.

This is the revised and enlarged edition of a book first issued some time ago, the demand for which has warranted the publishers in increasing

the supply. The book is divided into fourteen chapters their titles indicating all the stages through which the average suburban garden owner passes, from "Planning before Beginning" through the details to a final chapter on "The Value of Good Design." Some professional landscape architects may quarrel with the author's designs for small places, where the outlook from the house dictates a terminal motif, whereas his plan shows a terminal and central motif combined, which dissipates the attention or destroys the value of the garden as a composition. To the amateur, however, the book will be a useful step to more complete works. There are, too many illustrations, some of them very fine.—N. T.

Everyman's Garden in Wartime. BY CHARLES A. SELDEN. (338 pp. Dodd, Mead & Co., New York. 1917. \$1.35.)

Most of the subject matter in this book appeared in *The Country Gentleman* a few years ago, and was published in book form in 1913 under the title of *Everyman's Garden Every Week*.

It aims especially to help the suburbanite—"the man, who with his own hands is cultivating a piece of land and who, for his own sake, and for the sake of all of us, wants to get the best results from his efforts."

Except for those parts pertaining to the preparation of the soil, insect pests, etc., the chapters are arranged according to the calendar, describing garden operations as they are to be performed from April to November. Whilst this arrangement has some advantages, it is more than counterbalanced by the difficulties experienced if one merely wishes to look up the method of cultivation of any particular vegetable.

Of the whole the author has been successful in his aim to produce a book which is helpful to the suburbanite, but some of the advice given strikes one as being rather reckless. For instance—"A sprinkling of kerosene near the row will make the ground unlivable for a maggot that attacks beans." No doubt it will, but what of the effect of kerosene on the beans?

Although concerned primarily with vegetable growing, the flower garden receives some attention, and there are also various recipes given for canning and pickling vegetables and fruits.

Everyman's Garden in Wartime, possesses one advantage which is not always found in books which set out to teach the amateur how to garden, in that it is written entertainingly and is quite readable.—

MONTAGUE FREE.

Culture and Diseases of the Sweet Pea. By J. J. TAUBENHAUS. (223 pp. 46 figures. New York, E. P. Dutton & Co., 1917. Price \$2.00.)

This book is the first of a series by the same author, the others announced as in preparation being *Diseases of Truck Crops and their Control*, *Diseases of Greenhouse Plants* and *Disease of the Sweet Potato*. The point of view of the author in the book before us has been that it is intended both for the amateur and practical grower as well as for the scientific student of plant diseases. He has done well; but it would have been undoubtedly better if the author had been able to handle English with greater facility; also it would perhaps have appealed to the grower more readily if he had arranged his matter more logically, with the gardener's needs and limitations constantly in mind. For example, a brief statement of methods of control might wisely have followed the discussion of each disease. The grower is interested not so much in a scientific treatise on what troubles his sweet peas, as in the method of combating the disease. It is true, however, that the last two chapters in the book cover fairly clearly general preventive and control measures. Further, the use of technical terms is permissible in such a book only when they are clearly explained in untechnical language either in a glossary or explanatory chapter; this the author for the most part has not done.

The half-tones, which form the greater part of the illustrations, are well selected; while the three drawings, on the other hand, are very poor.

Nearly one-half the book, particularly that which treats of growing sweet peas, has been adapted from the writings of other experts especially for this book. The prefatory note is by Professor Mel T. Cook of Rutgers; the chapter on history, evolution, classification, and culture by Professor A. C. Beal of Cornell and Mr. Frank G. Cuthbertson; the one on culture of sweet peas for seed by C. C. Morse and Co. of California; the one on commercial culture of sweet peas under glass by Mr. Ant. C. Zvolanek; while the discussion of the insect pests has been adapted from the writings of Chittenden and others of the United States Department of Agriculture.

The author's own specialty, the disease side of the problem, has been, as stated above, for the most part well done; but a more logical rearrangement would make this part of the work much more effective.—E. W. OLIVE.

Plant Propagation. Greenhouse and Nursery Practice. BY M. G. KAINS.
(322 pp. with 213 illustrations. Orange Judd Co., New York. 1917.
Price \$1.50.)

In this book the author has brought together the latest information covering all branches of practical and theoretical plant propagation.

The result is a book that will at once appeal to the practical propagator and to the teacher of plant propagation in agricultural colleges and schools. The former will appreciate the lucid explanation of the principles underlying this important work, while as a text-book the student will find the order of arrangement by numbered paragraphs of decided assistance. In the chapters dealing with germination the conditions necessary for success are clearly described, together with various practices to aid germination in certain cases, and examples showing the value of a seed test and methods of conducting same. The various methods of propagating by vegetative means are treated very fully, with the why and the wherefore clearly explained.

About one-third of the book is devoted to a discussion from all angles of the principles and practices of "Graftage." The results of much experimental work are given, and those with opportunity for work along this line will find interesting possibilities suggested.

Chapters are given to Potting, Nursery Management, and Laws Affecting Nursery Stock.

Some seventy-six suggested practicums covering the whole subject are outlined which the beginner will find easy to follow.

The book concludes with twelve plant groups arranged in tabular form with condensed cultural instructions which the reader will find of special interest. Altogether this book can be considered a notable contribution to the literature dealing with this most fascinating subject and is deserving of a wide circulation.—H. ERNEST DOWNER.

The American Rose Annual (188 pp., + 9 plates). Issued by J. Horace McFarland Co., Harrisburg, Pa., for American Rose Society. 1918.

The third annual issue of what is easily the most important American periodical on the Rose will be welcomed by all Rosarians. It is in appearance and general contents up to the standard set by its predecessors, but the editor has gathered from different sources an interesting lot of opinions as to why we should grow Roses in war-time.

From the grower's viewpoint the most important section of the book is that by G. C. Thomas, Jr., on "Roses Retained and Discarded." The

observations of Captain Thomas (who while in France in the aviation service, is having his records kept up for him) are most impartial and accurate records of the "availability" of the scores and even hundreds of roses that come up for approval.

Professor Massey of Cornell has "More About Rose Diseases" and there are significant notes for amateurs. Articles on private and public rose gardens, new climbing roses, etc. No lover of roses and certainly no grower, either private or professional, can afford to be without this little book which is sent to all members of the American Rose Society. There is a beautiful colored plate of a new American-grown rose, Mrs. Henry Winnett.—N. T.

Notes and News

In the *Bulletin de l'Association des Maratchers de Genève* for November 1917, August Dufour gives an interesting account of forcing rhubarb in the open air.

Among the many methods in use, a very simple one consists in using an old cask, the bottom or end of which has been removed, the other being left.

After having dressed the foot of the rhubarb in November with fresh horse manure, the cask is placed over the roots and surrounded with a sufficient quantity of stable manure and litter to warm the plant and help the leaves to grow. A heat of from 25 to 30°C. is thus obtained. If too great a heat is to be feared air is let in through the bung-hole.

The following English and American varieties are distinguished by their earliness and are well adapted to forcing: Early Laxton Rhubarb, deeply coloured; Hotdays Giant; Hanke's Champagne; Daw's Champion; Johnston St. Martin; Dancer's Early Scarlet; and Mitchell's Royal Albert.

Over ninety thousand two cent packets of garden seeds were sold by the Brooklyn Botanic Garden to school children, during the early spring months.

Horticulture, and especially the *Florists Exchange* has suffered a great loss by the death on March 26, of J. Harrison Dick. He was born in Edinburgh, Scotland, October 13, 1877. His father was head gardener to Lieut.-Gen. Henry C. B. Melrose, and on this famous estate he spent his early days, excelling at all sports and enjoying the country, farm and garden, and his love for which was developed under his father's instruction.

In November, 1893, Dick went to Morton Hall, Liberton, as outside journeyman. Up at 6 o'clock every morning, he studied until 11 or 12 o'clock at night, and walked twice a week all winter to Edinburgh to attend lectures. His next place was Trinity Grove, Edinburgh, close to the Botanical Gardens, at which place he attended the classes on botany, physics, chemistry and landscape, gardening lectures, gaining certificates and prizes in botany, entomology, surveying, etc. In 1898 he went to the famous Veitch's Nurseries. In 1899 he joined the *Gardening World* of

London and was appointed sub-editor of the *Journal of Horticulture* in 1901. He studied wash drawings, and some of his illustrations appeared in the *Journal of Horticulture*.

Mr. Dick was one of the first to give illustrated lectures in England on gardening history subjects and was a member of the committee of the National Sweet Pea Society and National Dahlia Society of Great Britain and was an officer of the United Horticultural Benefit and Provident Association, which looks after indigent gardeners and florists.

In 1913 Mr. Dick became the editor of the *Florists Exchange*, published in New York. He believed that gardening was the highest pursuit man could follow and quickly became popular with American horticulturists. He was the author of *Sweet Peas for Profit*, *Commercial Carnation Culture* and *Mushroom Culture*, secretary of the American Dahlia Society, on the executive committee of the American Sweet Pea Society and the New York Florists Club and a member of the Society of American Florists.

Mr. Bryan Lathrop, who, during his lifetime, did so much for Chicago along musical lines, and left the bulk of his fortune to found a school of music, was intensely interested in all of the fine arts. We have recently run across the following short article from his pen. It was written many years ago, but we are sure our readers will find it of much interest at the present time.—O. C. SIMONDS.

A PLEA FOR LANDSCAPE GARDENING

The intelligent traveller observes one very striking difference between Europe and America.

In Europe he sees almost everywhere evidences of a sense of beauty. In America, almost everywhere he is struck by the want of it. In Europe, and in Asia, too, the work of man adds to the beauty of the picturesqueness of scenery. In America, it usually makes a blot upon it. I do not conclude from this that the American people have no sense of beauty, but only that in the mass it has not been cultivated. The mass is ignorant of beauty. In this new country of ours the struggle for existence has been intense, and the practical side of life has been developed while the aesthetic side has lain dormant.

To awaken this great nation to a love of the beauties of nature is therefore the mission of the first importance, and the time is ripe for the work. Signs of awakening are to be seen on every side, but much depends on the direction to be given to these new impulses of a people still in the main groping in the dark. Where shall we look for this direction? Obviously, I think, to Landscape Gardening.

Landscape Gardening is one of the rarest and greatest of the fine arts, but the one which has been least understood or appreciated. If it is an art to paint a landscape on a small canvas with brushes and paints, is it less an art to make a picture on broad acres, using for material God's own earth, grass, trees, shrubs and flowers? As a nation we have yet to learn that such an art exists.

Only last year when I suggested taking the advice of a highly-trained landscape gardener, one of the most intelligent women of my acquaintance asked me if "anyone could not plant a tree?" Anyone can build a house, but, is the result good architecture? Anyone can apply paint to a canvas, but, is the result a pleasing picture?

Landscape Gardening is not only one of the noblest of the fine arts, but in its perfection it is one of the most difficult.

When the architect, the painter and the sculptor have done their work it is as complete and perfect as the artist can make it. Not so with the landscape gardener. He must plant with the eye of a prophet, for it requires many years to bring to perfection the picture which he has imagined. He must know the character of every tree and shrub, the size, shape and color which it will have at maturity.

If he has designed his landscape with prophetic skill, it will grow in beauty year by year, intensifying the varieties of surface, creating vistas in which imagination delights; the masses of trees and shrubs will have assumed pyramidal form, contrasting or harmonizing each with the other; and the foliage will have acquired that exquisite blending of tones which is the despair of the painter.

The ideal landscape gardener should have a vast range of knowledge. He must be a botanist, and he must know the nature, the habits of growth of trees, shrubs and plants, and those which are adapted to each region; he should know the chemistry of horticulture, and the nature of soils; he should be an engineer, as the basis of his work is the grading and shaping of the earth's surface; he should have a knowledge of architecture, as his work will often make or mar the work of the architect; and, finally, he must be an artist to the tips of his fingers; the more artistic he is, the better landscape gardener he will be.

His life is devoted to a reverent and loving study of the most beautiful effects of nature and to the work of reproducing them for the pleasure of man.

My conclusion, then, is that we must look to landscape gardening for our inspiration in the new gospel of natural beauty. It will teach us how a back-ground of trees and a few vines trained by loving hands will transform the baldest cottage into a charming feature of a landscape.

The wild growth along a country roadside may be as lovely as anything painted by Rousseau. Let us teach the farmer to see its beauty and to leave it untouched.

The Women's Clubs have undertaken a noble work in teaching the people to see and to love beautiful things. May their efforts be crowned by success. May they redeem our country from the curse of bare and bald ugliness in the work of man. May the time come soon when our streets shall be lined with trees and shrubs; when front yards, and back yards, too, shall be softened by masses of flowering shrubs; and when the farmhouses, the cottages and the factories along our railways shall be redeemed by spreading trees and by shrubbery and creeping vines; when the European traveller in this country may be as much delighted by its beauty as he is now impressed by its prosperity.

[SIGNED] BRYAN LATHROP.

All those who use greenhouses will watch with interest and perhaps a dash of apprehension the rulings of the fuel administration regarding the use of coal for next season. The experience of last winter is not one that we wish to go through with again and it is the part of wisdom for all to study carefully the following, which was issued by the United States Fuel Administration on April 25. "The order as issued will curtail the consump-

tion of fuel by greenhouses 50 per cent for the coming year. The restriction applies to public, as well as private greenhouses, and will affect the White House greenhouses and the Botanical Gardens under a strict interpretation. Many famous greenhouses on private estates likewise will fall under the ban."

In explaining the order, the Fuel Administration said it is not intended to restrict the growing of plants for transplantation to produce summer vegetables.

Mrs. Charles B. Alexander has raised a fund and purchased three very lovely paintings of gardens by Helen Carlisle for the Club. Two of them are of Irish Gardens in Killarney and Tipperary and a very fine one is of Lord Northcliffe's Garden at Sutton Place, entitled "Two Sunny Paths." All of these are hung in a small reception room off the Library at Bartow.

During the first two weeks of May thousands of tulips were in flower on the terrace garden at Bartow. A beautiful show of hyacinths came about two weeks earlier. On May 23 a Red Cross tea was held in the house and under the trees at which the Marine Band from the Pelham Bay Naval Station played. Captain Hawkins of the Royal Artillery British Army spoke most feelingly of what the Red Cross means to the men in the trenches and behind the lines. The total receipts of over three hundred dollars for the tea were turned over to the Red Cross, through Mrs. Alexander's team, Number one, by Mrs. Hoffman at the Chamber of Commerce luncheon, on Friday, May 24.

Journal of the
**INTERNATIONAL
GARDEN CLUB**

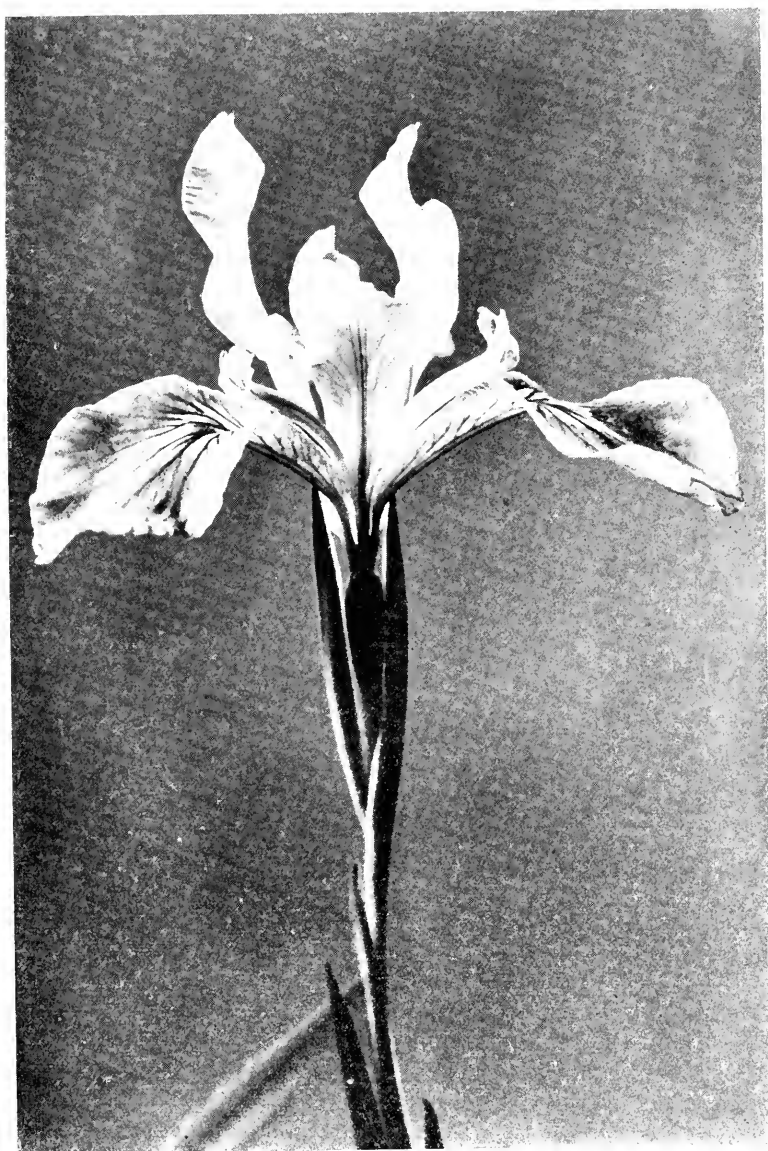
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IRIS TENAX

Flowers and the War

"Since America's entry into the war, much has been written about the state of mind in which our men will find themselves when they return in peace, the excitement, the danger, the hardships over.

What then can we offer these men as a reminder of the everyday life of home, a diversion from present pain, an assurance that there will be beauty in the work-a-day life of times of peace?

There is a simple panacea that holds inexplicable relief and power to sooth, that can lift thoughts back to hours of pleasure and arouse poignant memories. Not a man living but has been transported to fields and gardens of childhood by the sight and scent of a flower, and resting there has felt again the blessed safety of the surrounding walls of home.

A secretary of the Red Cross, asked recently whether he considered flowers helpful to the recovery of a sick soldier, answered briefly, 'To every man a flower is always home.'

Doctors in charge of these wounded boys say, 'Flowers are more valuable than tonic, especially when homesickness is added to all the other troubles. The men crave them and are more appreciative of them than of cigarettes and delicacies.' These statements remove the appeal we make to a higher plane than that of mere emotion and render a new form of service not only desirable but advisable.

At the beginning of the war, the hasty cry arose among garden club members 'Let us abandon flower gardens and greenhouses. War is stern and deals not with such beautiful trifles. War is costly and we need guns and food.' Many a patriotic flower-lover has with natural regret admitted that this was true.

But it is not all the truth. Of late saner thought and wider knowledge are leading us to a different conclusion and we are now authorized as flower lovers and producers to substitute practical service for unnecessary sacrifice. Our maturer decision should be, 'Here I have an asset, a possession of definite use to my country. Because war is stern, I will find a way to mitigate even in slight measure its evil effects. Because war is costly I will aid in bringing health and hope to at least one of those whom war has wasted and thrown aside.'

Every community, club, and individual to which this patriotic service is possible must work out a practical plan to satisfy the increasing demand. For as the months pass and hospitals multiply, the tragic misery that follows in the wake of war is coming nearer home.

And when the gray winter shuts down on those who have returned and will return from that grim battle front, shall not some of us be ready with the flowers that 'stand for home,' that speak of hope and give assurance of the common life of peace to which in God's good time we and they shall day by day awake?"



IRIS FORRESTII

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Iris Notes

By B. Y. Morrison



HERE are many roads of adventure for the person who wishes to explore the whole of the Genus *Iris*. For the veriest amateur, there are the myriad forms of the bearded irises; some of the more common of the water-loving species, all of them representatives of the beardless section; the inevitable Spanish Irises from the bulbous section and a few of the more common Evansias, or crested irises. And should he progress from his "veriest" estate, he can find the difficult *Oncocyclus* and *Regelia* Groups for his pains, or the less familiar members of the *Apogon* and *Evansia* Groups or the still less common members of the bulbous group. For myself, I must plead only the beginner's experience and this wholly confined to those species that are rhizomatous. Yet I make bold to commend my favorite plants to all because of the great pleasure that may be had from a little collecting and from the inevitable growth of ones critical appreciation.

The usual happening in garden collecting of iris is that the collector is overwhelmed with the charms of the bearded iris

and these with the Japanese irises take up all of his time and attention. There is a certain justice in this for it must be admitted that these two groups do make a greater garden display than most of the others and they do certainly survive longer under conditions that would dismay the more fastidious members of the family. Let us therefore examine the groups that are less commonly used before returning to the rich fields of the more familiar sections.

It is a matter of genuine regret that I cannot offer as full a report on the other groups as I should like. The pages of Mr. Dykes' *The Genus Iris* still entice me to further possessions but these are slow of accomplishment for desire always outstrips fulfilment. The results that follow are from my own experience and the pictures are of flowers from my own garden, kindly taken for me by Mr. A. A. Ruark.

Following the arrangement of the groups that is used by Mr. Dykes in the book mentioned above, the first section is that of the Beardless group and the first member is the familiar *Iris sibirica*.

IRIS SIBIRICA in all its many forms is a species easily managed by any one. It grows well in ordinary soil, that is not too full of lime and that does not suffer for lack of water in the summer. They will endure considerable drought, as I know, but the amount of bloom is markedly lessened. Personally I prefer those forms that hold their flowers well above the foliage, to the dwarfer forms. Of the latter, the variety *orientalis* of the catalogues, has the larger flowers and the more intense blue color. In regard to color alone the form Blue King is even more intense. Snow Queen is the excellent white companion variety. All of these have large falls with a rounded blade as contrasted with the narrower segments of the typical species. All of these iris should be used in large clumps and if it is possible to have them so placed that they may be seen with the light shining through them, the effect is still more exquisite,

All of the varieties seed more freely than is agreeable and the seedlings make good plants which commonly flower the second year.

IRIS DELAVAYI I cannot describe. I have both plants and seedlings but neither have flowered although they have made excellent growth.

IRIS WILSONI I do not have as yet but *Iris Forrestii* has made a splendid clump of dwarf grassy foliage and this season threw up several stalks, bearing charming yellow sibirica-like flowers. The growth is markedly slender, the leaves a vivid green, with me, about ten inches high and the flower stalks with two flowers in the terminal cluster are pale yellow with some light brown veining in the throat of the bloom. With me only hand-fertilized blooms set seed.

Like *Iris Delavayi*, both *Iris chrysographes* and *I. Clarkei* have declined to bloom although both have made excellent growth. As compared to the clumps formed by sibirica, their growth is much more open and ragged. *Iris Bulleyana*, I have not succeeded in securing as yet and *Iris prismatica* the American member of the sibirica group I do not have but in a friend's garden it grows freely with *Iris versicolor* and *I. Pseudacorus* in low wet ground.

The California irises are still an experiment with me. Knowing them from a one-time California residence, I can vouch for their beauty. Here in the east, I have had a small plant of *Iris Douglasiana* which has lived through two eastern winters; it has not however adjusted itself to the new garden as well as other plants obtained this spring. These have been far more gracious so that already I have fair clumps of several color forms of *Douglasiana* and of *Iris macrosiphon*. *Iris longipetala* has been even more rapid in its acceptance of the new situation. The first two are dwarf species, with evergreen foliage that is characteristically tough and wiry. The root system from the thin hard rhizomes is very meager so that transplanting is difficult. The flowers are rather like those of *Iris tenax*, but are carried on less slender stems. The colors range from almost pure white through pale yellow to flesh or lavender, with some deep lilac and blue forms. In the California garden the pale forms were most abundant and more vigorous, but this is not always the case. For *I. macro-*

siphon I cannot speak from experience. Mr. Dykes' figure shows a flower resembling *Douglasiana* in general aspect but with the long perianth tube that is the mark of the species. *Iris tenax* another Pacific Coast species, I have from seed only. Two small clumps represent the total result of a packet of seed. The plants have done well, even in the cold winter of 1917. The foliage is evergreen, about eight inches high, very slender not more than one-eighth inch in width. The flower stalks are very slight and bear a terminal head with two flowers. The one seedling that has bloomed for me is a deep reddish pink color with the characteristic white markings below the tiny yellow blotch under the style arm. It is most dainty and should make a good subject for the front of the perennial border. There is a considerable range of color from the deep reds to almost pure whites. *Iris longipetala* is a delightful iris with tall very tough leaves and strong stalks bearing flowers of a most delightful shade of pale lavender. The segments are narrow and have a characteristic twist that gives them a very airy and graceful poise.

IRIS STYLOSA and its varieties is in a group that I have long wished to try but could not obtain until this spring. The plants suffered greatly in the moving, as they, too, have very slender rhizomes and scanty roots. The single flowers of the white form that survived to bloom was a very pure and shining white.

The great group to which *Iris spuria* belongs is one which I believe should be used more commonly in gardens, especially those where water can be freely supplied in the late spring and early summer. The plants form large clumps of stout foliage and bear strong stalks of bloom. These vary greatly in relation to the height of the foliage but do not commonly overtop the leaves to any great extent nor are they hidden among them. One of the group is *Iris Gueldenstaedtia*, a form with the most narrow segments of any, perhaps the least attractive of all the varieties. Belonging to this group aside from the lavender forms of *spuria*, there is the lovely *Iris orchroleuca* with white to sulfur flowers bearing a good orange blotch on the falls; *Iris aurea*

with large golden yellow flowers and *Iris Monnerii* another yellow form. Then, too, there are the intermediate hybrids between these yellow and lavender forms. The great objection to the entire lot is that they resent moving and are likely to sulk for a year after the move. Another member of this group is *Iris graminea*, a small and not showy flower that I cherish for its perfume. It is easily handled, growing anywhere and bearing the short stalks of flowers half-hidden among the leaves. The perfume is very much like that of ripe apricots and is much enjoyed when the flowers are picked for table decoration. This iris like all of the apogons is very beautiful when picked and arranged in shallow bowls together with its foliage, all held in place by some one of the Japanese flower holders.

IRIS LAEVIGATA is a charming iris with all the grace of the species and is not to be confused with *Iris Kaempferi* and its hybrids. In Japan it is commonly grown in the temple gardens on the margins of ponds in very shallow water that can be drained off in winter. In summer it forms great mats of foliage, resembling *Pseudacorus*, with the large flowers of intense blue throughout the mass. There are also white forms, whites with a flush of lavender on the style arms, the lavender spotted form known as *I. albo-purpurea* and various reddish purple forms that are most unattractive. My plants have grown well but have not flowered to date. Seed germinated better the second year after sowing and the seedlings have grown well.

I am not sure that I have seen the wild type of *Iris Kaempferi*. Its garden hybrids are familiar to all. Given full sun, plenty of water and rich soil, they flourish madly. For myself, I prefer the white forms, single and double together with those which are delicately veined on a white ground. One especial white that I treasure is known by the Japanese name, Zama-no-mori. It has immense white petals, three in number, each with the faintest blue clouding below the primrose blotch. One other with the name, Kyodaisan, is the most delicate of pale blue selfs. Of the veined sorts, Iso-no-nami, is a typical example of those veined with blue lavender and Shokko-nishiki, one veined with red lavender. Nearly all of these veined kinds



IRIS FOLIOSA

have dark style arms so that there is a striking contrast to the pale spreading petals. But in these matters, nearly everyone has a different feeling about the colors so that it is scarcely safe to be too dogmatic in the matter of varieties.

Returning to American species from the south we have, *Iris foliosa* a dwarf plant with a widely running rhizome and great pale blue lilac flowers borne nestling among the leaves. *Iris hexagona* shows similar growth but has not bloomed as yet. *Iris fulva* forms tall clumps from which rise the branching stalks bearing the curious dull terra-cotta colored flowers. Common over much of the east is *Iris versicolor*, this comes in several variations of which one is *Fosteri* with pointed falls and suggesting the more solid color at the tips of the falls. Variety *Kermisian* is similar but of a distinctly reddish purple color. Both of these varieties are open to the objection that there is a greater mass of plant than of bloom but the flowers are very charming for cutting. Mr. Dykes refers back to this species, the *Iris caroliniana* of Watson. If not distinct botanically, for the gardener and collector there is an interesting difference in color, with much cleaner veining of clear blue lilac on an almost white ground and the yellow blotches confined to a definite area as in the Japanese irises. There is some interesting variation among collected plants in regard to color, especially as to the size and shape of the blotch, which may give some useful material in breeding.

IRIS TRIPETALA. From the south I have also an interesting iris which is of especial value to me in its late blooming, for the flowers come with the last of the Japanese iris about the middle of June. It is a curious plant with a straggling open growth and very slender leaves. The flower stalks are about ten inches in height scarcely overtopping the leaves and bear a terminal head of pale lavender flowers, flushed with deeper color. Like *Iris setosa*, this flower is conspicuous in that the standards are greatly reduced.

From the mountains of the south also comes *Iris verna* a delightful small iris which shows its small vivid blue lavender flowers before the leaves have pushed to their full growth.



IRIS TRIPETALA

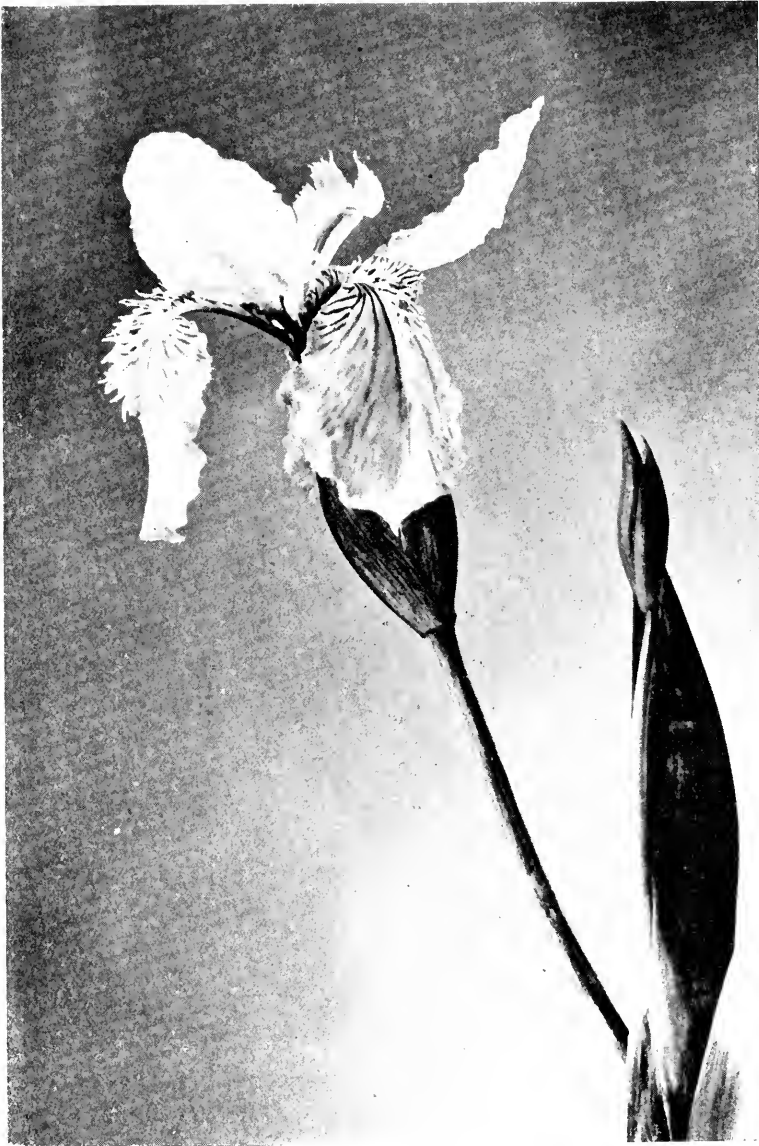
The flowers are marked by a small but bright orange blotch and by a delightful but not strong perfume. The flowers are borne almost on the level of the earth so that they are of garden value only in mass at the front of the border.

Aside from the Japanese and Siberian irises the most common apogon is *Iris Pseudacorus* the European counterpart of our own *I. versicolor*. This is most easily raised in any situation for although a water loving kind it will flourish in very dry situations. There is great variation in the shape of the falls and only plants with large size should be kept. There are several pale ivory to primrose colored forms as well as the typical bright yellow form. It is a beautiful plant, forming a large sheaf of sturdy dark green leaves through which shine out the brilliant yellow flowers. As it seeds pestiferously, the flower stalks should be cut off as soon as the last bloom has withered.

One other iris of the beardless section I have and that is *Iris ensata*, the common iris of the Orient. My seedling plants are making good growth but have not reached the size for blooming. In the wild it forms great mats or tussocks from the persistent fibrous remains of the leaves. Through these push yearly the new growths, the flowers coming close to the ground and soon overtopped and hidden by the leaves. The flowers that I have seen are rather dull affairs, but I have read that there are forms that are more desirable. At any rate there is a considerable difference in the ultimate height of the leaves.

Evansia Group

Leaving the Apogon irises, the next group is that called Evansia. In these irises the mark that sufficiently distinguishes them for the gardener is the crest that is found on the falls. (See *Iris tectorum*). For our purposes we can dismiss the charming but tender *Iris japonica* and start with the lovelier *Iris tectorum*. In my garden this iris suffers much from the freezing of its evergreen foliage. In old plants the clumps are disfigured by the leaves half-browned till blossom time, but seedlings, which are easily raised, recover much more



IRIS TECTORUM

quickly and soon hide all with lush new growth. The leaves are very broad and of a noticeably yellow green color. The branching flower stalks rise well above them bearing the charming blue lavender blossoms, dashed with deeper color and showing the white crest. Seed sets freely, germinates readily and a fair percentage of the seedlings bloom the second year. I have found no variations. Mr. Dykes figures a flower the result of a cross with the Loppio variety of Cengialti. I have found that *tectorum* pollen with me does not give a large per cent of seed on pogoniris crosses but I have this year a good number of pods with pogoniris pollen on *tectorum*. The results were pods of malformed seed.

IRIS MILESII is too new a resident of my garden to report. It has a stouter rhizome than *tectorum* and darker leaves. The flowers are said to be red purple and less beautiful than *tectorum*.

IRIS GRACILIPES is a delightful small iris for the semi-shady border, or better the rock garden. It forms tufts of slender yellow green foliage from which rise the delicate sprays of rosy lavender flowers.

The other member of this group, easily obtained, is our own *Iris cristata*. It is easily handled if not overrun by stronger perennials and soon forms large mats, from which rise in the early spring the charming lavender flowers with the marking of white and yellow. It is easily increased by division. This year my plants are seeding but I am told that the seeds are slow of germination and often perish quickly because they are so slight and susceptible to any drought.

The next group is the difficult Oncocyclus Group. I can offer no report on this for I have ventured only three species. *Iris susiana* did well for a few years and then perished. As it is easily replaced the tragedy is only temporary. There is much difference of opinion as to the beauty of the flower for the colors are distinctly dull, but the venation is so exquisite and the size of the bloom so impressive that I like to have it. The only other species that I have flowered is *Iris iberica* which is truly wonderful for the delicate venation of the standards and the deep



PARVAR, AN ONCOCYCLUS-
POGONIRIS HYBRID

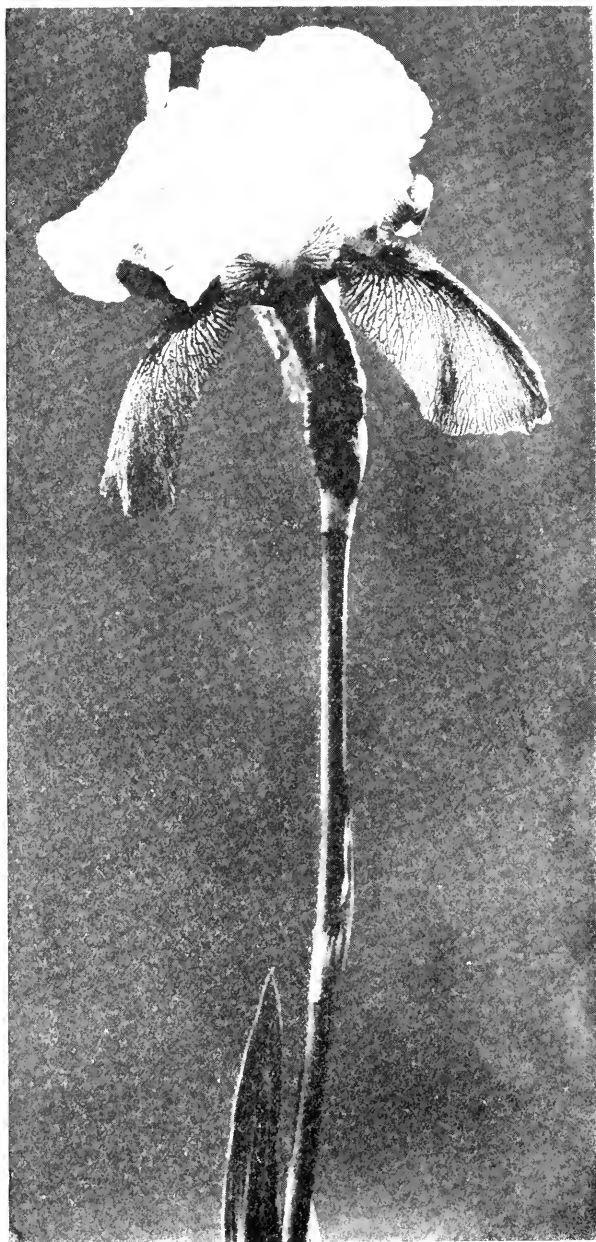
rich velvety patch on the falls. But this too sulks and although I have many plants they are not happy with me under conditions calculated to give them their enforced autumn rest. *Iris Gatesi* I have kept for two years only to lose it over night for no reason at all. So that the members of this group give one either rich reward or nothing at all for his pains.

But there are in the market a number of hybrids with various pogoniris. Two are illustrated with this paper. They are both the work of the late Sir Michael Foster. *Parvar* is a cross between *I. paradoxa* and *variegata* as is shown in the small horizontal falls; *Dilkash* is, I believe, a *pallida* \times *iberica* seedling and a beautiful one it is. The large flowers have the most exquisite veining and dotting over both standards and falls. The colors run from blue lavender to red purple, even to black in the small patch where the veins are confluent. These two, with *Parsam* and *Paracina* have grown and increased slowly for me. One other, The Dove, of which *I. lupina* is one parent, barely holds its own. I have missed seeing the bloom each year.

Similar to these but less sure are the various *Oncocyclus-Regelia* hybrids that are in the trade. These have a better constitution than the parent *Oncocyclus* but are not very certain at best. Of the varieties that I have seen I care most for Mars, in which the venation is a clear deep blue on a white ground.

The *Regelia* irises are almost as thankless as the *Oncocyclus* species. I have had only the forms of *Iris Korolkowi* which are distinct in the form of the segments and in the type of venation. The latter is obscured somewhat by the color in the form shown. *Iris Leichtlini* gave several very beautiful iridescent blooms and then perished with but one exception which seems ready to follow suit. The flowers are bronzy flushed with purple.

This year I have from an American hybridizer a number of varieties, crosses between *Iris Korolkowi* and Pogoniris, I believe. The rhizomes show markedly the *Korolkowi* blood and excite great curiosity for the coming spring and their flowering. The same grower has also some *Susiana* hybrids which look promising.



DILKASH, AN ONCOCYCLUS-
POGONIRIS HYBRID



IRIS KOROLOKOWI
ATROPURPUREA

Omitting the section of the *Pseudoregelias*, of which I have no member, there remains only the great section of the *Pogoniris* or the bearded irises, for I have no intent to discuss any of the bulbous forms of iris. Here is the happy hunting ground for the beginner and for the collector of discrimination. The history of the development and improvement of these irises is long and the beginnings obscure; moreover, the final issue is by no means as yet. This spring I went carefully over a large collection of varieties representing most of the stock of one of the large growers in this country and I feel sure that in ten years time there will be no excuse for growing more than five of the varieties in it, unless it be for historical purposes. In size, and habit they have been superseded and in color they have been either improved or duplicated in better forms. But even today these new aspirants are by no means certain of their places for daily new ones come to the front.

In the old gardens and often in the beginnings of amateurs collections today, there are first the old blue and the Florentine, with Maori King perhaps and a clump of the excellent *Pallida Dalmatica*. Now there are myriads. All the members of the *Pogoniris* group are interesting, but to the gardener many of the species are of less value than their offspring. Culturally all are sun and lime lovers and object to crowding and deep planting.

For the choice of the gardener today there are as I have said many forms. Early begins the show with the dwarf species, none of which are so very important except for botanical interest although *Iris statellae*, primrose yellow and its variety *olbiensis*, claret purple, are very charming. Next come the results of the interbreeding of these forms and species, the so-called Alpines and Crimeans of the catalogues. Here it is a matter of taste. The best program is to visit a nursery at blooming time and choose the forms that appeal most. In this way many of the greenish yellows and dull purple-yellows may be avoided. Following them is the group of Intermediate Irises. These are real iris but not so beautiful as the later forms. For myself, I still cherish, Ingeborg, a large gray white; Walhalla, with

standards blue and falls red purple; Halfdan, ivory yellow; Gerda, dull brownish yellow, and Dorothea, a gray white flushed with lavender. Ivorine, white to greenish.

After these come the great mass of the tall bearded irises, early and late. For my own "less choice" border I still must have Florentine, old Common Blue, Kharpur, Amas and Fontarabie, as they are all early and different.

But from here on each person must choose for himself. In the following list I have ventured a selection as I would have it today if I might buy without limit. Those printed in small capitals only are the varieties that I believe will not be displaced by better forms.

Whites: Albicans, Florentina, Innocenza, LA NEIGE, KASHMIR WHITE.
Yellows: Flavescens, DAWN, Shelford Yellow, Aurea, Mrs. Neubronner, SHEKINAH.

Blue to lavender: PALLIDA DALMATICA, Juniata, CYPRIANA CATERINA, Celeste, Albert Victor, Rembrant, Tinae.

Pink to claret: Mrs. Alan Gray, Her Majesty, Queen of May, DREAM, ISOLINE, EDUARD MICHEL, PARC DE NEUILLY.

Bicolors: Anne Leslie, Victorine, Thorbecke, Loreley. IRIS KING, MAGNATE, MERLIN, Premier, PROSPER LAUGIER, ALCAZAR, ARCHEVEQUE, Nine Wells, Whiffenpoof, ORIFLAMME, Monsignor, Baronet, Lent B. Williamson.

Frills: ANNA FARR, E. L. CRANDALL, JEANNE D'ARC, COUNT DE ST. CLAIR, Parisiana, Ma Mie.

Blends: Eldorado, Afterglow, MAD. CHERI, ENSIGN, Nue D'Orage.

I realize perfectly that this list will not, cannot be satisfactory to everyone, but I do feel very strongly that it does contain the cream of the newer iris as they are coming to the trade and so far as I know them. What will be in store for us from the continued work of the hybridizers remains to be seen. Perhaps in less time than I now think for all of these varieties will have to be retired in favor of newer and better forms.

Historical Notices of Landscape Gardening in America

*By Andrew Jackson Downing**

“L’un à nos yeux présente
D’un dessein régulier l’ordonnance imposante,
Prête aux champs des beautés qu’ils ne connaissaient pas,
D’une pompe étrangère embellit leur appas,
Donne aux arbres des lois, aux ondes des entraves,
Et, despote orgueilleux, brille entouré d’esclaves;
Son air est moins riant et plus majestueux
L’autre, de la nature amant respectueux,
L’orne sans la farder, traite avec indulgence
Ses caprices charmants, sa noble négligence,
Sa marche irrégulière, et fait naître avec art,
Des beautés du désordre, et même du hasard.”

DELILLE.



OUR first, most endearing, and most sacred associations,” says the amiable Mrs. Hoffland, “are connected with gardens; our most simple and most refined perceptions of beauty are combined with them.” And we may add to this, that Landscape Gardening, which is an artistical combination of the beautiful in nature and art—an union of natural expression and harmonious cultivation—is capable of affording us the highest and most intellectual enjoy-

* Reprinted from “Theory and Practise of Landscape Gardening; adapted to North America.” This book, first published in 1841, ultimately went through eight editions—Ed.

ment to be found in any cares and pleasures belonging to the soil.

The development of the Beautiful is the end and aim of all Landscape Gardening, as it is of all other fine arts. The ancients sought to attain this by a studied and elegant regularity of design in their gardens; the moderns, by the creation or improvement of grounds which, though of limited extent, exhibit a highly graceful or picturesque epitome of natural beauty. Landscape Gardening differs from gardening in its common sense, in embracing the whole scene immediately about a country house, which it softens and refines, or renders more spirited and striking by the aid of art. In it we seek to embody our *ideal* of a rural home; not through plots of fruit trees, and beds of choice flowers, though these have their place, but by collecting and combining beautiful forms in trees, surfaces of ground, buildings, and walks, in the landscape surrounding us. It is, in short, the Beautiful, embodied in a home scene. And we attain it by the removal or concealment of everything uncouth and discordant, and by the introduction and preservation of forms pleasing in their expression, their outlines, and their fitness for the abode of man. In the orchard, we hope to gratify the palate; in the flower garden, the eye and the smell; but in the landscape garden we appeal to the sense of the Beautiful and the Perfect, which is one of the highest attributes of our nature.

This embellishment of nature, which we call Landscape Gardening, springs naturally from a love of country life, an attachment to a certain spot, and a desire to render that place attractive—a feeling which seems more or less strongly fixed in the minds of all men. But we should convey a false impression, were we to state that it may be applied with equal success to residences of every class and size, in the country. Lawn and trees, being its two essential elements, some of the beauties of Landscape Gardening may, indeed, be shown wherever a rood of grass surface, and half a dozen trees are within our reach; we may, even with such scanty space, have tasteful grouping, varied surface, and agreeably curved walks; but our

art, to appear to advantage, requires some extent of surface—its lines should lose themselves indefinitely, and unite agreeably and gradually with those of the surrounding country.

In the case of large landed estates, its capabilities may be displayed to their full extent, as from fifty to five hundred acres may be devoted to a park or pleasure grounds. Most of its beauty, and all its charms, may, however, be enjoyed in ten or twenty acres, fortunately situated, and well treated; and Landscape Gardening, in America, combined and working in harmony as it is with our fine scenery, is already beginning to give us results scarcely less beautiful than those produced by its finest efforts abroad. The lovely villa residences of our noble river and lake margins, when well treated—even in a few acres of tasteful foreground—seem so entirely to appropriate the whole adjacent landscape, and to mingle so sweetly in their outlines with the woods, the valleys, and shores around them, that the effects are often truly enchanting,

But if Landscape Gardening, in its proper sense, cannot be applied to the embellishment of the smallest cottage residences in the country, its principles may be studied with advantage, even by him who has only three trees to plant for ornament; and we hope no one will think his grounds too small, to feel willing to add something to the general amount of beauty in the country. If the possessor of the cottage acre would embellish in accordance with propriety, he must not, as we have sometimes seen, render the whole ridiculous by aiming at ambitious and costly embellishments; but he will rather seek to delight us by the good taste evinced in the *tasteful simplicity* of the whole arrangement. And if the proprietors of our country villas, in their improvements, are more likely to run into any one error than another, we fear it will be that of too great a desire for display—too many vases, temples, and seats,—and too little purity and simplicity of general effect.

The inquiring reader will perhaps be glad to have a glance at the history and progress of the art of tasteful gardening; a recurrence to which, as well as to the history of the fine arts, will afford abundant proof that, in the first stage or infancy of

all these arts, while the perception of their ultimate capabilities is yet crude and imperfect, mankind has, in every instance, been completely satisfied with the mere exhibition of *design* or *art*. Thus in Sculpture the first statues were only attempts to imitate rudely the *form* of a human figure, or in painting, to represent that of a tree: the skill of the artist, in effecting an imitation successfully, being sufficient to excite the astonishment and admiration of those who had not yet made such advances as to enable them to appreciate the superior beauty of *expression*.

Landscape Gardening is, indeed, only a modern word first coined, we believe, by Shenstone.

The most distinguished English Landscape Gardeners of recent date, are the late Humphrey Repton, who died in 1818; and since him John Claudius Loudon, better known in this country as the celebrated gardening author. Repton's taste in Landscape Gardening was cultivated and elegant, and many of the finest parks and pleasure grounds of England at the present day, bear witness to the skill and harmony of his designs. His published works are full of instructive hints, and at Cobham Hall, one of the finest seats in Britain, is an inscription to his memory, by Lord Darnley.

Mr. Loudon's writings and labors in tasteful gardening are too well known to render it necessary that we should do more than allude to them here. Much of what is known of the art in this country undoubtedly is, more or less directly, to be referred to the influence of his published works. Although he is, as it seems to us, somewhat deficient as an artist in imagination, no previous author ever deduced so clearly sound artistical principles in Landscape Gardening and Rural Architecture; and fitness, good sense, and beauty are combined with much unity of feeling in all his works.

As the modern style owes its origin mainly to the English, so it has also been developed and carried to its greatest perfection in the British Isles. The law of primogeniture, which has there so long existed, in itself contributes to the continual improvement and embellishment of those vast

landed estates, that remain perpetually in the hands of the same family. Magnificent buildings, added to by each succeeding generation, who often preserve also the older portions with the most scrupulous care; wide spread parks, clothed with a thick velvet turf which, amid their moist atmosphere, preserves during a great part of the year an emerald greenness—studded with noble oaks and other forest trees which number centuries of growth and maturity; these advantages, in the hands of the most intelligent and the wealthiest aristocracy in the world, have indeed made almost an entire landscape garden of “merry England.” Among a multitude of splendid examples of these noble residences, we will only refer the reader to the celebrated Blenheim, the seat of the Duke of Marlborough, where the lake alone (probably the largest piece of artificial water in the world) covers a surface of two hundred acres: Chatsworth, the varied and magnificent seat of the Duke of Devonshire, where there are scenes illustrative of almost every style of the art: and Woburn Abbey, the grounds of which are full of the choicest specimens of trees and plants, and where the park, like that of Ashbridge, Arundel Castle, and several other private residences in England, is only embraced within a circumference of from ten to twenty miles.

On the continent of Europe, though there are a multitude of examples of the modern style of landscape gardening, which is there called the *English* or *natural* style, yet in the neighborhood of many of the capitals, especially those of the south of Europe, the taste for the geometric or ancient style of gardening still prevails to a considerable extent; partially, no doubt, because that style admits, with more facility, of those classical and architectural accompaniments of vases, statues, busts, etc., the passion for which pervades a people rich in ancient and modern sculptural works of art. Indeed many of the gardens on the continent are more striking from their numerous sculpturesque ornaments, interspersed with fountains and jets-d’eau, than from the beauty or rarity of their vegetation, or from their arrangement.

In the United States, it is highly improbable that we shall ever witness such splendid examples of landscape gardens as those abroad, to which we have alluded. Here the rights of man are held to be equal; and if there are no enormous parks and no class of men whose wealth is hereditary, there is, at least, what is more gratifying to the feelings of the philanthropist, the almost entire absence of a very poor class in the country; while we have on the other hand, a large class of independent landholders, who are able to assemble around them, not only the useful and convenient, but the agreeable and beautiful, in country life.

The number of individuals among us who possess wealth and refinement sufficient to enable them to enjoy the pleasures of country life, and who desire in their private residences so much of the beauties of landscape gardening and rural embellishment as may be had without any enormous expenditure of means, is every day increasing. And although, until lately, a very meagre plan of laying out the grounds of a residence was all that we could lay claim to, yet the taste for elegant rural improvements is advancing now so rapidly, that we have no hesitation in predicting that in half a century more there will exist a greater number of beautiful villas and country seats of moderate extent, in the Atlantic States, than in any country in Europe, England alone excepted. With us, a feeling, a taste, or an improvement, is contagious; and once fairly appreciated and established in one portion of the country, it is disseminated with a celerity that is indeed wonderful, to every other portion. And though it is necessarily the case where amateurs of any art are more numerous than its professors, that there will be, in devising and carrying into execution, many specimens of bad taste, and perhaps a sufficient number of efforts to improve without any real taste whatever, still we are convinced the effect of our rural embellishments will in the end be highly agreeable, as a false taste is not likely to be a permanent one in a community where everything is so much the subject of criticism.

With regard to the literature and practice of Landscape Gardening as an art, in North America, almost everything is yet before us, comparatively little having yet been done. Almost all the improvements of the grounds of our finest country residences, have been carried on under the direction of the proprietors themselves, suggested by their own good taste, in many instances improved by the study of European authors, or by a personal inspection of the finest places abroad. The only American work previously published which treats of Landscape Gardening, is the *American Gardener's Calendar*, by Bernard McMahon of Philadelphia. The only practitioner of the art, of any note, was the late M. Parmentier of Brooklyn, Long Island.

M. Andre Parmentier was the brother of that celebrated horticulturist, the Chevalier Parmentier, Mayor of Enghien, Holland. He emigrated to this country about the year 1824, and in the Horticultural Nurseries which he established at Brooklyn, he gave a specimen of the natural style of laying out grounds, combined with a scientific arrangement of plants, which excited public curiosity, and contributed not a little to a taste for the natural mode of landscape gardening.

During M. Parmentier's residence on Long Island, he was almost constantly applied to for plans for laying out the grounds of country seats, by persons in various parts of the Union, as well as in the immediate proximity of New York. In many cases he not only surveyed the demesne to be improved, but furnished the plants and trees necessary to carry out his designs. Several plans were prepared by him for residences of note in the Southern States; and two or three places in Upper Canada, especially near Montreal, were, we believe, laid out by his own hands and stocked from his nursery grounds. In his periodical catalogue he arranged the hardy trees and shrubs that flourish in this latitude in classes, according to their height, etc., and published a short treatise on the superior claims of the natural over the formal or geometric style of laying out grounds. In short, we consider M. Parmentier's labors and examples as having effected, directly, far more for

landscape gardening in America, than those of any individual whatever.

The introduction of tasteful gardening in this country is, of course, of very recent date. But so long ago as from 25 to 50 years, there were several country residences highly remarkable for extent, elegance of arrangement, and the highest order and keeping. Among these we desire especially to record here the celebrated seats of Chancellor Livingston, Wm. Hamilton, Esq., Theodore Lyman, Esq., and Judge Peters.

Woodlands, the seat of the Hamilton family, near Philadelphia, was, so long ago as 1805, highly celebrated for its gardening beauties. The refined taste and the wealth of its accomplished owner were freely lavished in its improvement and embellishment; and at a time when the introduction of rare exotics was attended with a vast deal of risk and trouble, the extensive green-houses and orangeries of this seat contained all the richest treasures of the exotic flora, and among other excellent gardeners employed was the distinguished botanist Pursh, whose enthusiastic taste in his favorite science was promoted and aided by Mr. Hamilton. The extensive pleasure grounds were judiciously planted, singly and in groups, with a great variety of the finest species of trees. The attention of the visitor to this place is now arrested by two very large specimens of that curious tree, the Japanese Ginko (*Salisburia*), 60 or 70 feet high, perhaps the finest in Europe or America, by the noble magnolias and the rich park-like appearance of some of the plantations of the finest native and foreign oaks. From the recent unhealthiness of this portion of the Schuylkill, *Woodlands* has fallen into decay, but there can be no question that it was, for a long time, the most tasteful and beautiful residence in America.

The seat of the late Judge Peters, about five miles from Philadelphia, was, 30 years ago, a noted specimen of the ancient school of landscape gardening. Its proprietor had a most extended reputation as a scientific agriculturist, and his place was also no less remarkable for the design and culture of its pleasure-grounds, than for the excellence of its farm.

Long and stately avenues, with vistas terminated by obelisks, a garden adorned with marble vases, busts and statues, and pleasure grounds filled with the rarest trees and shrubs, were conspicuous features here. Some of the latter are now so remarkable as to attract strongly the attention of the visitor. Among them is the chestnut planted by Washington, which produces the largest and finest fruit; very large hollies; and a curious old box-tree much higher than the mansion near which it stands. But the most striking feature now, is the still remaining grand old avenue of hemlocks (*Abies canadensis*). Many of these trees, which were planted 100 years ago, are now venerable specimens, ninety feet high, whose huge trunks and wide spread branches are in many cases densely wreathed and draped with masses of English Ivy, forming the most picturesque sylvan objects we ever beheld.

Lemon Hill, half a mile above the Fairmount waterworks of Philadelphia, was, 20 years ago, the most perfect specimen of the geometric mode in America, and since its destruction by the extension of the city, a few years since, there is nothing comparable with it, in that style, among us. All the symmetry, uniformity and high art of the old school, were displayed here in artificial plantations, formal gardens with trellises, grottoes, spring-houses, temples, statues, and vases, with numerous ponds of water, jets-d'eau, and other water-works, parterres, and an extensive range of hothouses. The effect of this garden was brilliant and striking; its position, on the lovely banks of the Schuylkill, admirable; and its liberal proprietor, Mr. Pratt, by opening it freely to the public, greatly increased the popular taste in the neighborhood of that city.

On the Hudson, the show place of the last age was the still interesting *Clermont*, then the residence of Chancellor Livingston. Its level or gently undulating lawn, four or five miles in length, the rich native woods, and the long vistas of planted avenues, added to its fine water view, rendered this a noble place. The mansion, the green-houses, and the gardens, show something of the French taste in design, which Mr.

Livingston's residence abroad, at the time when that mode was popular, no doubt, led him to adopt. The finest yellow locusts in America are now standing in the pleasure-grounds here, and the gardens contain many specimens of fruit trees, the first of their sorts introduced into the Union.

Waltham House, about nine miles from Boston, was, 25 years ago, one of the oldest and finest places, as regards Landscape Gardening. Its owner, the late Hon. T. Lyman, was a highly-accomplished man, and the grounds of Waltham House bear witness to a refined and elegant taste in rural improvement. A fine level park, a mile in length, enriched with groups of English limes, elms and oaks, and rich masses of native wood, watered by a fine stream and stocked with deer, were the leading features of the place at that time; and this, and Woodlands, were the two best specimens of the modern style, as Judge Peters' seat, Lemon Hill, and Clermont, were of the ancient style, in the earliest period in the history of Landscape Gardening among us.

There is no part of the Union where the taste in Landscape Gardening is so far advanced, as on the middle portion of the Hudson. The natural scenery is of the finest character, and places but a mile or two apart, often possess, from the constantly varying forms of the water, shores, and distant hills, widely different kinds of home landscape and distant view. Standing in the grounds of some of the finest of these seats the eye beholds only the soft foreground of smooth lawn, the rich groups of trees shutting out all neighboring tracts, the lake-like expanse of water, and closing the distance, a fine range of wooded mountain. A residence here of but a hundred acres so fortunately are these disposed by nature, seems to appropriate the whole scenery round, and to be a thousand in extent.

At the present time, our handsome villa residences are becoming every day more numerous, and it would require much more space than our present limits, to enumerate all the tasteful rural country places within our knowledge, many of which have been newly laid out, or greatly improved within a few

years. But we consider it so important and instructive to the novice in the art of Landscape Gardening to examine, personally, country seats of a highly tasteful character, that we shall venture so refer the reader to a few of those which have now a reputation among us as elegant country residences.

Hyde Park, on the Hudson, formerly the seat of the late Dr. Hosack, now of W. Langdon, Esq., has been justly celebrated as one of the finest specimens of the modern style of Landscape Gardening in America. Nature has, indeed, done much for this place, as the grounds are finely varied, beautifully watered by a lively stream, and the views are inexpressibly striking from the neighborhood of the house itself, including, as they do, the noble Hudson for sixty miles in its course, through rich valleys and bold mountains. But the efforts of art are not unworthy so rare a locality; and while the native woods, and beautifully undulating surface are preserved in their original state, the pleasure-grounds, roads, walks, drives and new plantations, have been laid out in such a judicious manner as to heighten the charms of nature. Large and costly hot-houses were erected by Dr. Hosack, with also entrance lodges at two points on the estate, a fine bridge over the stream, and numerous pavilions and seats commanding extensive prospects; in short, nothing was spared to render this a complete residence. The park, which at one time contained some fine deer, afforded a delightful drive within itself, as the whole estate numbered about seven hundred acres. The plans for laying out the grounds were furnished by Parmentier, and architects from New York were employed in designing and erecting the buildings. For a long time this was the finest seat in America, but there are now many rivals to this claim.

The Manor of Livingston, lately the seat of Mrs. Mary Livingston (but now of Jacob Le Roy, Esq.), is seven miles east of the city of Hudson. The mansion stands in the midst of a fine park, rising gradually from the level of a rich inland country, and commanding prospects for sixty miles around. The park is, perhaps, the most remarkable in America, for the

noble simplicity of its character, and the perfect order in which it is kept. The turf is, everywhere, short and velvet-like, the gravel roads scrupulously smooth and firm, and near the house are the largest and most superb evergreens. The mansion is one of the chastest specimens of the Grecian style, and there is an air of great dignity about the whole demesne.

Blithewood, formerly the seat of R. Donaldson, Esq. (now John Bard, Esq.), near Barrytown, on the Hudson, is one of the most charming villa residences in the Union. The natural scenery here is nowhere surpassed in its enchanting union of softness and dignity—the river being four miles wide, its placid bosom broken only by islands and gleaming sails, and the horizon grandly closing in with the tall blue summits of the distant Kaatskills. The smiling, gently varied lawn is studded with groups and masses of fine forest and ornamental trees, beneath which are walks leading in easy curves to rustic seats, and summer houses placed in secluded spots, or to openings affording most lovely prospects. In various situations near the house and upon the lawn, sculptured vases of Maltese stone are also disposed in such a manner as to give a refined and classic air to the grounds.

As a *pendant* to this graceful landscape, there is within the grounds scenery of an opposite character, equally wild and picturesque—a fine, bold stream, fringed with woody banks, and dashing over several rocky cascades, thirty or forty feet in height, and falling altogether a hundred feet in a distance of half a mile. There are also, within the grounds, a pretty gardener's lodge by the gate, in the bracketed mode; in short, we can recall no place of moderate extent, where nature and tasteful art are so harmoniously combined to express grace and elegance.

Montgomery Place, the residence of Mrs. Edward Livingston, which is also situated on the Hudson, near Barrytown, deserves a more extended notice than our present limits allow, for it is, as a whole, nowhere surpassed in America, in point of location, natural beauty, or the landscape gardening charms which it exhibits.

It is one of our oldest improved country seats, having been originally the residence of General Montgomery, the hero of Quebec. On the death of his widow it passed into the hands of her brother, Edward Livingston, Esq., the late minister to France, and up to the present moment has always received the most tasteful and judicious treatment.

The lover of the expressive in nature, or the beautiful in art, will find here innumerable subjects for his study. The natural scenery in many portions approaches the character of grandeur, and the foreground of rich woods and lawns, stretching out on all sides of the mountain, completes a home landscape of dignified and elegant seclusion, rarely surpassed in any country.

Among the fine features of this estate are the *wilderness*, a richly wooded and highly picturesque valley, filled with the richest growth of trees, and threaded with dark, intricate and mazy walks along which are placed a variety of rustic seats. This valley is musical with the sound of waterfalls, of which there are several fine ones in the bold impetuous stream which finds its course through the lower part of the wilderness. Near the further end of the valley is a beautiful lake, half of which lies cool and dark under the shadow of tall trees, while the other half gleams in the open sunlight.

In a part of the lawn, near the house, yet so surrounded by a dark setting of trees and shrubs as to form a rich picture by itself, is one of the most perfect flower-gardens in the country, laid out in the arabesque manner, and glowing with masses of the gayest colors—each bed being composed wholly of a single hue. A large conservatory, an exotic garden, an arbo-retum, etc., are among the features of interest in this admirable residence. Including a *drive* through a fine bit of natural wood, south of the mansion, there are five miles of highly varied and picturesque private roads and walks, through the pleasure grounds of Montgomery Place.

Ellerslie is the seat of William Kelly, Esq. It is three miles below Rhinebeck. It comprises over six hundred acres, and is one of our finest examples of high keeping and good management, both in an ornamental and agricultural point of view.

The house is conspicuously placed on a commanding natural terrace, with a fair foreground of park surface below it, studded with beautiful groups of elms and oaks, and a very fine reach of river and distant hills. This is one of the most celebrated places on the Hudson, and there are few that so well pay the lover of improved landscape for a visit.

Just below Ellerslie are the fine mansion and pleasing grounds of Wm. Emmet, Esq.,—the former a stone edifice, in the castellated style, and the latter forming a most agreeable point on the margin of the river.

The seat of Mrs. Gardiner Howland, near New Hamburg, is not only beautiful in situation, but is laid out with great care, and is equally remarkable for the many rare trees and shrubs collected in its grounds.

Wodenethe, near Fishkill landing, is the seat of H. W. Sargent, Esq., and is a bijou full of interest for the lover of rural beauty; abounding in rare trees, shrubs and plants, as well as vases, and objects of rural embellishment of all kinds.

Kenwood, formerly the residence of J. Rathbone, Esq., is one mile south of Albany. Ten years ago this spot was a wild and densely wooded hill, almost inaccessible. With great taste and industry Mr. Rathbone has converted it into a country residence of much picturesque beauty, erected in the Tudor style, one of the best villas in the country, with a gate-lodge in the same mode, and laid out the grounds with remarkable skill and good taste. There are about 1200 acres in this estate, and pleasure grounds, forcing houses and gardens are now flourishing where all was so lately in the rudest state of nature; while, by the judicious preservation of natural wood, the effect of a long cultivated demesne has been given to the whole.

The Manor House of the "*Patroon*" (as the eldest son of the Van Rensselaer family is called) is in the northern suburbs of the city of Albany. The mansion, greatly enlarged and improved a few years since, from the designs of Upjohn, is one of the largest and most admirable in all respects, to be found in the country, and the pleasure grounds in the rear of the house are tasteful and beautiful.

Nature's Garden Across Southern Canada

By *Alfred C. Hottes*

Assistant Professor of Floriculture, Ohio State University



THIS August when we start from Toronto, but after a week has elapsed it seems spring in the mountains of Alberta and British Columbia, due to the activity of growth and the melting of snow from higher altitudes. We have to see America hurriedly, in true American fashion, consequently we merely have the opportunity to visit several of the beauty marks in the mountains of Canada. These remarks are, therefore, not those of a botanist, but of a tourist.

We chose to go by way of Georgian Bay, Lakes Huron and Superior, and from thence directly west through Manitoba, Saskatchewan, Alberta and British Columbia. Each mile of the distance proves interesting. To the traveler who has even a slight knowledge of plant life all trips are filled with interest. Every rock which weathers gives sufficient soil for some sort of vegetation.

On the Great Lakes, resigning ourselves to the luxury of the steamer, we enjoy feeding the sea gulls and gazing at the receding shore lines with their various shades of green. Finally islands come into view; islands which seem overflowing with tree and shrub life. No wonder the novelist writes of islands of enchantment for they seem to hold a secluded mystery. In Lake Huron the land gradually becomes farther and farther from our vision and we recall Washington Irving's sketch "The Voyage." The spirit of out-of-sight-of-land grows even more interesting when steaming through Lake Superior for here the water becomes rough, fogs gather, reports are received of boats run

ashore upon the rocks, and some even become seasick. It seems now as though we were really upon a body of water that would allow us to believe we are taking a voyage.

The end of our voyage is Fort William. Several hours are available to see this quiet Canadian town. We are particularly concerned with the aromatic atmosphere which is found to be due to the abundance of the Balm of Gilead (*Populus candicans*), a species of Poplar with resinous buds. New England grandmothers would need no explanation that the gum from this



VIEW FROM HOT SULFUR SPRINGS: VALLEY OF BOW RIVER

tree makes an excellent liniment. Never have we seen the annual flowers so prolific of bloom as here. The *Lobelias* are masses of flowers; the leaves being cheated of a space to get light.

Once aboard the train in Ontario, the only opportunity to see the vegetation is to snatch glimpses of trees and fleeting patches of color at the sides of the railroad tracks. A reddish purple flower which is abundant all through southern Canada is soon recognized as the Fire Weed (*Chamaenerion angustifolium*). So soon as we know the name we wonder at it and find that it is not derived from the color of the flower, but from the fact that the

plant obtains a hold upon soil which has been recently burned over. After flowering, long seed vessels are produced which break open in four divisions, allowing fluffy seeds to escape.

I can best describe my impressions of this part of the country when I quote from a letter.

Today I have been riding along the shore of the Lake-in-the-Woods. The titles of post cards procured at Benora, the principal city, will give some idea of this wonderful lake. One reads, "There are hundreds of such channels," and another "Among the 10,000 islands." How I should like to stop here for a month. The islands are thick with evergreens; acres of Birches border our railroad track.

After passing Winnipeg we come to the vast prairies. Mile after mile we ride and neither see a person nor a village, but small shacks and log huts are scattered sparsely along through this boundless flat country. Reaching a city, however, the great beauty of the station grounds is surprisingly attractive for the flowering plants grow most luxuriantly.

It is hot and the air so heavily laden with dust that our hair becomes like knife sharpeners. It is, therefore, a real pleasure to realize that after riding for several days we will awaken the next morning and be at the Gap of the Canadian Rockies. At four o'clock the porter informs us that we should rise. How bracing the air is! We raise the curtains, outside the windows we see the Bow river, rapid, cool and green. The Rockies rise abruptly from the miles of prairie. The effect is startling. In a few moments the snow capped peaks of the Three Sisters come into view. At eight o'clock we arrive at Banff. Eagerly our luggage is deposited at the hotel and we set out to tramp among the mountains. Which are the most interesting, the mountains or the countless wild flowers? We admire the alpine plants at our feet and then when a vista opens up through the trees we look at the towering peaks about us or at the snake-like Bow river below.

The tree life is very abundant, but the species are rather limited. The main evergreen is the columnar White Spruce (*Picea Englemanni*). Like the Colorado Blue Spruce, the leaves vary in color from bluish green to steel-blue, but the White Spruce is not so stiff in growth and makes excellent specimens in cultivation. So deceptive is the distance and clear the air that the trees appear like coarse grass upon Sulfur mountain. These trees are often four hundred years old and grow about a hundred feet tall. Interspersed among the Spruces are the Balsam Firs, the commonest species being, no doubt, *Abies lasiocarpa*. Unfortunately this species does not grow well in cultivation.

Two pines are found, *Pinus contorta Murrayana* and *P. albicaulis*. *P. contorta Murrayana* is known as the Black or Lodgepole Pine, and grows in a rather pyramidal form often 150 feet high in the wild, although it is quite shrubby in cultivation. In its native haunts it is not found upon the higher altitudes. The White-barked Pine, *P. albicaulis*, is less common, but extends into the upper ranges, it rarely grows over 30 feet tall

At the edges of the most precipitous points stand the Lyall's Larches (*Larix Lyalli*), weather-torn, sturdy and resembling the picturesque trees admired by the Japanese. Its light airy branches offer no hindrance to our



LAKE LOUISE

view over the valley, but furnish a veil and frame to our vista. This tree has very brittle branches and is always asymmetrical because each year branches are broken by the struggles of the tree with the snows and strong wind.

Scattered through the forest we find huge specimens of the Douglass Spruce (*Pseudotsuga taxifolia*) adorned with their fantastic cones, each large bract of which has its midrib produced into a long rigid point. The finding of this tree is a surprise, for it is one of our popular introduced evergreens in the East. As a lumber tree it is said to produce more wood to the acre than any other species and is highly ornamental as well.

Compared with the abundant display of the conifers, the deciduous trees are of lesser importance. There are several poplars, namely, *Populus*

tremuloides, the aspen poplar and cotton-wood which grows along the banks of streams, which may be *P. Sargentii*. The shrubby Birch (*Betula glandulosa*) with its roundish leaves forms high clumps in valleys and in season causes the lakes to be covered with a yellowish scum due to the profusion of pollen which is shed. At least two other species should be found, namely, *B. occidentalis* and *B. fontinalis*, both of which are usually taller than *B. glandulosa* and with larger leaves. A species or two of Willow we see, but they are apt to be less than 20 feet tall. *Salix argophylla* and, especially, the glossy leaved *S. Sitichensis* are advised for ornamental planting.

Growing all through the Mountains in bare, rocky places or in partial shade were the gaudy scarlet and orange-scarlet Indian Paint Brushes (*Castilleja*). It is interesting to know that these plants are saprophytes, deriving their nourishment from the roots of other plants. The flowers are inconspicuous, but are surrounded by brilliantly colored bracts. Miss Julia W. Henshaw, in her delightful book "Mountain Wild Flowers of America" describing this flame flower says it is the only Alpine wild flower that really rivals the scarlet geranium of our cultivated gardens, and no grander sight may be seen by travellers than where from the tree line, close to the eternal snows that enfold the towering mountain tops, down into the deep green heart of the valleys, the slopes and steeps are clothed with a marvelous mantle of vermilion and golden Castillejas. As the sunlight flames across these royal-robed hills every blossom blooms and burns with effulgent glory, until

Earth's crammed with Heaven,
And every common bush afire with God.

No words can describe the brilliant beauty of such a scene. Every color, every shade from coral pink to cardinal, from canary tint to tangerine, is growing and blowing on either hand, with here and there a single snowy spike to emphasize the splendid conflagration of color.

Had you been with us as we walked up the side of the mountain to Sulfur Springs you should have been dared by some co-traveler to taste several sorts of greenish hot-spring water. Besides this, you should have marveled at the beauty of the nodding bells of the white Rocky Mountain Rhododendrons (*Rhododendron albiflorum*) which bloom twice a year, in June and August.

You would also have noted other shrubs covered with clustered yellow berries. When the bison roamed the mountains in great numbers they fed upon these attractive fruits and they have since been called Buffalo Berries (*Shepherdia argentea*). Banff still maintains the largest herd of the American Buffalo. Growing near the Buffalo Berry is usually found a shrub which has silvery grey leaves, branches, flowers and berries. It is appropriately called the Silver Berry (*Elæagnus argentea*). Both of these shrubs are in cultivation.



LAKE LOUISE LOOKING UP AT VICTORIA GLACIER

The eastern eye accustomed to seeing a low-growing species of Wood Betony, will find here on shady grassy slopes one of gigantic proportions, with yellow flowers, called the Tall Lousewort (*Pedicularis bracteosa*). There are several species rather common with pink flowers. They do not seem to persist in cultivation. Bailey suggests that they may require a particular host plant in the same way that the Indian Paint brushes live upon other plants.

Several *Spiræas* grow abundantly along the roads up the mountain. One of the most attractive is the Birch-Leaved

Spiræa (*S. lucida*) which has corymbs of creamy colored, downy flower heads. We notice huge patches of plants only a few inches tall bearing blooms resembling the Flowering Dogwood and are surprised to realize that it is a dwarf Dogwood known as the Bunch-berry (*Cornus canadensis*), so named because the



VIEW FROM LAKE AGNES

flowers are followed by small red berries. Blueberries and Mountain Cranberries are also found. A most attractive ground cover, the Mountain Cranberry (*Vaccinium Vitis-Idæa*), produces dark red, acid fruits larger than currants and it is said to be used for food by the trappers and Indians of Canada.

Just off the pony path is Kidney Springs. This is an interesting nook where the gaudy Blanket Flowers (*Gaillardia aristata*) grow abundantly. These are cultivated and prized highly in the borders of our gardens. It is interesting to speak with an old gentleman who has gathered a bunch of Self Heal, or *Prunella*, saying that it is good for affections of the heart and is a most lucky plant to have growing in one's garden. Self Heal is hardly considered a wild flower with us, but a weed.

When we have returned to the hotel at the noon hour the word "lunch" sounds interesting. We can hardly finish our meal before we become aware of the fact that the coach is leaving for Lake Minnewanka. Sitting with the driver you ask him the names of some of the flowers. He is clever and never fails you with a fanciful name for each plant.

He who has not seen great patches of the blue Harebell (*Campanule rotundifolia*) such as cover the sides of the small ravines leading to Lake Minnewanka can hardly appreciate the lines of Dr. L. H. Bailey:

There is a ferny dell I know
 Where spiry stalks of harebell grow.
 It is a little cool retreat
 Of bosky scents and airs complete.
 There is a maze of fragile stems
 That hang their pods above the hems
 Of mossy fountains crystal clear
 'Mongst webby threads of gossamer
 And filmy tints of green and blue
 A-strung in beads of fragrant dew.
 A tiny stroke the blue-bell rings
 As on its slender cord it swings,
 And if you listen long and well
 You'll hear the music in the bell.

* * * * *

There are two worlds that I know full well
 The world of men and the petal bell.

Growing with this dainty beauty are the Mountain Larkspurs (*Delphinium Brownii*?). We see many other interesting

plants on the road, but we can not think of the flowers so soon as as we board the little tug, called the "Mother of Peaks." The jolly captain, standing on the bow steers the boat with his feet and keeps up a continual patter of serious and semi-comic talk, telling us the history of each spot and points out the usual resemblances of the rock formations to animal shapes. The little lake winds in and about jutting promontories like a silver ribbon and at each mile one feels that the end of the lake is in view.

Let us leave Banff, not that we have seen all the plants, but we are taking a mere glimpse. The railroad continues along the Bow River and climbs through a beautiful valley bordered high above us with snowy ledges. Suddenly ahead appears Castle Mountain, like a fairy castle of our dreams. For eight miles it extends with its turrets and walls and we are sure it is an unreality, like a spectacle in a play.

Each mile we climb, we feel more and more the grandeur of the mountains. The train stops for we are at Laggan. Before we can get our sense of direction or decide what we will do, we find ourselves hustled into a small mountain car and are on our way to the Chalet of Lake Louise. We have heard that Lake Louise is America's most beautiful picture. Dare we look, just for a second, before claiming our reservations at the Chalet? Yes, we will look. The picture is perfect. A robin's egg blue lake surrounded by tree clad mountains framing the immaculate Victoria glacier—a study in blue, green and white or should we express it as a picture painted with turquoises, emeralds and pearls. We pause for a time and are very quiet.

It is only after persons promise us that equally charming views may be enjoyed by visiting the Lakes-in-the-Clouds that we arm ourselves with knapsack-lunches and climb the pony path. It is impossible to make record climbs if one finds interesting plants at each step. We cannot take a step without catching a color or a fragrance which draws our attention. When we step into a quiet hollow just off the bridle path we breath deeply for there is a most delightful perfume in the air. It proves to come from a most insignificant pinkish blue flower,

the Northern Twin Flower. Its delicate charms were enhanced by remembering that it bears the name *Linnaea*, so called because the great Linnaeus, godfather of Botany chose this flower as his crest. Each person picks a small posy to wear, the men for their buttonhole and the ladies for their corsage. If one's



TUNNEL MOUNTAIN

interest leads them to admire the beautiful, even if it be in miniature, other plants will be noted, namely: the White and Pink Flowering Shin-leaves or Wintergreens (*Pyrola secunda*, *chlorantha* and *elliptica*, the greenish white sorts; *P. asarifolia*, the pink species). These sorts when moved with a ball of earth may be used in the rockery. Here we find also the *Mo-*

neses, or the One-flowered Wintergreen, the translation of name from the Greek means "single delight" and aptly refers to the dainty pink or white drooping flower borne single upon its slender stem. In cool spots where water trickles we look for the Saxifrages and find the yellow sort (*Saxifraga aizoides*). Of the taller Saxifrages two are common, *S. Nutkana* and *S. Lyalli*, the former is the taller and has leaves rounder than the *S. Lyalli*. Both have white flowers. The Anemones or Wind flowers have finished blooming, but are showing their wooly heads. We find the Pearly Everlasting, (*Anaphalis margaritacea*) with its furry leaves and immortelle flowers. It is so white in appearance that it seems a patch of snow.

We reach Mirror Lake, a tiny mirror truly, tucked into the mountainside, tree margined and unruffled. Towering above it is the Beehive, the name is well chosen, we should have named it such ourselves. Huge masses of the False Hellebore (*Veratrum viride*) tall and of a springlike green are growing with their stately spikes of greenish flowers. Nearby is seen the White Heliotrope or Valerian (*Valeriana sitchensis* or *sylvatica*). The flowers are very fragrant and frequently have a rosy tinge.

We climb a bit farther by a very winding path and reach Lake Agnes. We gaze over the valley of the Bow. Several hundred feet below lays the crystal Mirror Lake and a mile straight down is Lake Louise, like a spot of the sky. In the far distance is a background of the snow-capped peaks of the Sawback. We have a cup of tea and cakes at the tea house, and fear that we shall never persuade ourselves to leave. We climb the base of the Beehive and find a red lichen which causes the rocks to appear painted in spots. Here also we note patches of a plant which reminds one of the Heather, it is the Red and Yellow False Heath (*Bryanthus* or *Phyllodoce empetrifomis*, the red or white and *B. glanduliflora*, the yellow), it is fully as beautiful as its Scotch cousin, but without the sentiment of its associations. Draped over the ledges of the Beehive is a lycopodium-like plant bearing small pinkish bells and four-ranked, keeled leaves, it is *Cassiope*, or White Heath (*C. Mertensiana*). In cultivation this plant succumbs immediately to dry air and

drought but here the cool glacial water gradually seeps through the shale rock and it is attractive. We look under a small cascadill of the Bridal Veil Falls tripping from Lake Agnes to Mirror Lake and find what we first believe to be a gentian, but it is the bluish Purple Beard Tongue (*Pentstemon Menziesii*). In the small chinks of the rocks and spreading like a mat, grows the Alpine Avens (*Dryas Drummondii*). The flower is small and, as Miss Henshaw suggests "meekly droops its head as if conscious of its lack of good looks." The plumed seed heads are the attractive parts. Before maturing they appear as silky curled tassels. The leaves are white beneath and contrast with the blue-green upper surface.

It is growing dark when we descend the mountain. The thorough tiredness which follows such a day is welcome for it is soon lost in perfect slumber.

The next morning we set out again upon our journey ever westward. We catch sight of a mountain goat, but are told by the experienced persons that imagination is always ripe in the mountains, that bears, goats and other animals range the mountains, but patches of shubbery and rock formations miles away, do resemble goats.

We pass the sign which designates the Great Divide which marks the point where the streams separate to join either the Pacific Ocean or Hudson Bay, then we make a figure eight through the tunnels of Cathedral Mountain and Mount Ogden and after crossing and recrossing the Kicking Horse River several times, we arrive at Field, a town nestled at the base of Mt. Stephen. On we speed to join the Columbia River where the tree life seems dwarfed by the towering mountains. We soon reach Glacier and looking up at the huge snow field we feel an impending danger. But glaciers move slowly and it is over two miles to Illecillewaet Glacier which is not coming toward us, but receding. Above us, towers Mt. Sir Donald at a height of 10,808 feet. The grounds about the hotel are a fresh green and the Spruces are the finest specimens seen upon our journey. In this region we also note groves of White Cedar (*Thuja gigantea*). Our train speeds on along the Thompson River, finally joining

the Fraser, tumultuous and foaming. In this romantic spot it seems fitting to see Indians fishing for salmon along its shores, but we wonder how they manage to travel these precipitous ledges.

Large specimens of the Western Yew (*Taxus brevifolia*) are here noted. Dr. G. M. Dawson even records trees eighteen inches in diameter in this region. Hemlocks, Spruce and Pine also abound. The Western Hemlocks (*Tsuga Mertensiana*) attain a height of 200 feet.



VICTORIA FROM PARLIAMENT BUILDINGS.
THE PUBLIC GARDENS

And so we hasten to the coast, Vancouver and Victoria. At Vancouver we are impressed with the primeval forest of Stanley Park and see some truly big trees. In Victoria we are again interested in the perfect development of the garden flowers, especially the Dahlias which are gigantic in growth and size of bloom.

Our journey through Canada is at an end. We traveled too hurriedly. Perennially there occurs to us all the wish to see

more of this entrancing country. We must return and bring back for cultivation many of these alpine beauties, many of which we have found are not readily transplanted. Seeds must be collected and carefully sown after making accurate notes of their natural environments. Perhaps a few of the more common plants seen by the tourist are here noted, and some one will enjoy the vegetation more fully. We found hundreds of persons interested in the names of these plants, inquiring right and left. When one knows even a few of the trees and flowers by name, he is not alone in the mountains, but among intimate friends whose habits and charms he will soon come to know.

Further Report on the War Work of the International Garden Club



IN THE JOURNAL for June there appeared an account of the leasing of "Nevis" at Irvington-on-Hudson where the dairy for the Club's war work has been established. The enterprise is now in splendid working shape and daily deliveries of the best of milk have helped many mothers and infants over critical summer days. The milk has been delivered, either free or at cost, to three different distributing agencies. The following is the report of the Milk Committee of the Club.

REPORT OF THE MILK COMMITTEE FOR WAR WORK

The Committee for War work of the International Garden Club takes this opportunity to report to its members, the most successful results of three months organization.

We started on May 1, 1918, and for three months—May, June and July have sent between six and seven thousand quarts of the very best certified milk to New York, this being a daily average of about seventy-two quarts. The cost of production has been about two-thirds of what it would have cost to have bought the same amount of milk, and it would have been impossible to have obtained such milk, as 98 per cent of all milk sold in New York now is pasteurized (that horrid condition of a wonderful natural product), and certified milk of the kind we have been producing, can only be obtained in small quantities, at a very high price—18 cents to 25 cents per quart. The following reports which are received monthly from the nurses in charge of the distribution of the milk, will show what good is being done, as only those, who come in contact with invalids and small children, can realize the difference between the results obtained by pure natural milk and the pasteurized kind, which is almost now the only milk obtainable.

The house at Nevis is being put in order and rooms can be rented there after October 10, to assist in supporting this work. It is to be hoped, that members will avail themselves of this opportunity of stopping in a charming place.

As our War work is entirely dependent on contributions and was undertaken by the general wish of the members, that the club should do something of this kind during the War, we hope, that they will remember, that we cannot continue it without their interest and support.

Contributions should be sent to the Columbia Trust Co., 34th Street and Fifth Avenue for the War Work Fund of the International Garden Club.

ZELIA K. HOFFMAN,
Chairman.

Milk Committee for War Work of the International Garden Club

MRS. CHARLES FREDERICK HOFFMAN, Chairman	
MRS. JOHN E. ALEXANDRE	MRS. HERBERT HARDE
DR. NICHOLAS MURRAY BUTLER, ex-	
officio	MISS ELIZABETH KEAN
DR. HENRY D. CHAPIN	MR. ADOLPH LEWISOHN
MRS. FREDERICK R. COUDERT	DR. GEORGE NORTON MILLER
MR. STUART DUNCAN	MRS. LEWIS GOUVERNEUR MORRIS
DR. AUSTIN FLINT	MISS FRANCES PERKINS
MRS. LEWIS GAWTRY	MRS. ERNEST M. STIRFS
MRS. LAWRENCE L. GILLESPIE	MRS. MARSHAL ORME WILSON
MRS. J. J. WYSONG	

The latest report of the distribution from the Maternity center of Union Settlement at 237 East 104th Street, down to August 12, gives some idea what the scope of the work has been. A letter from Mrs. Morrison, the supervising nurse, together with a detailed report and summary of results is printed herewith.

August 16, 1918.

Mrs. Charles Frederick Hoffman,
New York, N. Y.

MY DEAR MRS. HOFFMAN:—

Enclosed please find memorandum of disposal of milk from July 5 to August 15 inclusive.

Your milk is deeply appreciated by the mothers of the district and the children are certainly thriving wonderfully well on it.

A social worker remarked to me the other day that she never saw such a

change for the better as there was in one of the families that has been getting the milk for some time. To use her own words, "It was the salvation of that family." The children that were under weight and anemic are now getting along so well that it is a pleasure to watch them.

Mr. Jago sent us a number of hampers of vegetables which we gave out to the mothers who appreciated them very much.

Yours very truly,

[SIGNED] EDITH K. MORRISON,
Supervising Nurse.

New York Milk Committee

Memorandum to Mrs. Hoffman from Mrs. Morrison. August 15, 1918

DATE	BOTTLES MILK RECEIVED	QUARTS SOLD	QUARTS FREE	RECEIPTS	DISBURSEMENTS	TOTAL
July 15.....	42	34	8	\$3.40	\$.15 - ice	\$3.25
July 16.....	36	28	8	2.80	.15 - ice	2.65
July 17.....	42	34	8	3.40		3.40
July 18.....	36 (1 broken)	26	9	2.60	.15 - ice	2.45
July 19.....	36	25	11	2.50	.15 - ice	2.35
July 20.....	36	29	7	2.90		2.90
July 22.....	36	27	9	2.70		2.70
July 23.....	36	27	9	2.70		2.70
July 24.....	35 (1 broken)	28	7	2.80		2.80
July 25.....	36	27	9	2.70		2.70
July 26.....	23 (1 broken)	17	6	1.70		1.70
July 27.....	24	17	7	1.70		1.70
July 29.....	24	17	7	1.70		1.70
July 30.....	23 (1 broken)	16	7	1.60		1.60
July 31.....	24	16	8	1.60		1.60
August 1.....	24	15	9	1.50		1.50
August 2.....	24	17	7	1.70		1.70
August 3.....	24	20	4	2.00		2.00
August 5.....	24	19	5	1.90	.10 - ice	1.80
August 6.....	24	20	4	2.00		2.00
August 7.....	24	19	5	1.90		1.90
August 8.....	24	22	2	2.20		2.20
August 9.....	24	18	6	1.80		1.80
August 10.....	24	18	6	1.80		1.80
August 12.....	24	15	9	1.50		1.50
August 13.....	24	16	8	1.60		1.60
August 14.....	24	17	7	1.70		1.70
August 15.....	24	17	7	1.70		1.70
Total.....						\$59.40
Money order.....						.15
						\$59.25

August 21, 1918.

New York Milk Committee

Milk sold and given away to patients of the maternity Center, Union Settlement, 237 East 104th Street

DATE	BOTTLES MILK RE- CEIVED	QUARTS SOLD	QUARTS FREE	RECEIPTS	DISBURSE- MENTS	TOTAL
May 11.....	793	558*	235	\$ 55.30	\$4.75	\$ 50.55
June 11.....						
June 11.....						
July 15.....	977	710	267	71.00	4.25	66.90
July 15.....						
August 15.....	800	601	199	60.10	.70	59.40
Total.....	2570	1869	701	\$186.40	\$9.70	\$176.85

*10 quarts sold at \$.05 a quart.

In addition to the milk delivered to the Union Settlement, 24 quarts a day have been sent to the Vanderbilt Clinic, department of Social Service. A few of their cases are cited to show what the work of the Club has meant to many unfortunates.

Among the patients to whom the milk from the International Garden Club has been given, the following cases might receive special mention, although every one on the list has shown improvement:

The Benvenuto family, consisting of father, mother and eight children. All the children showed the effect of improper diet, which had consisted principally of macaroni and other starchy foods. Two quarts a day are given here, and marked improvement shown. A child of six in so poor a condition that eruption on skin and eye trouble had developed. All now clearing up, and child will be able to enter school in the fall.

Sheridan boy, age 13 years. An early case of pulmonary tuberculosis. Has gained since having the milk, and is in a fair way to be cured. Has gained eight pounds.

Mrs. Campbell, nursing mother. Mother anaemic, and baby on supplementary feeding. The mother has improved so much that the baby now has been put back on all breast feeding as the mother has sufficient breast milk for him.

Mrs. Nixon, colored woman with undersized twins. Both mother and twins are gaining. She nurses both babies.

Class of cases for the month of June

Nursing mothers.....	11
Malnutrition.....	7
Tuberculosis.....	2
Tuberculosis observation.....	9
Tuberculosis, bone and gland	4
Chorea.....	1
Cardiac child.....	1
Stomach and anaemia.....	1
	<hr/>
	36

Still a third institution has benefited through the work, as the following letter shows.

NEW YORK NURSERY AND CHILD'S HOSPITAL

161 WEST 61ST STREET

NEW YORK

August 19, 1918.

*Mrs. Charles F. Hoffman,
Armsea Hall,
Newport, R. I.*

MY DEAR MRS. HOFFMAN:

I want very much, in behalf of our babies and mothers, to extend to you our very sincere appreciation for the generous supply of milk, which comes to us daily, and for the weekly donation of vegetables and fruit.

I cannot tell you what this means to our people, and how grateful the women are for your thought of them.

I am enclosing a marked copy of our last monthly *Bulletin*, which will, I think prove interesting to you, and I am mailing under separate cover, several additional copies, which you may care to distribute among the members of the Club.

Again thanking you for this wonderfully generous gift, I am

Very sincerely yours,

[SIGNED] RYE MORLEY,
Superintendent.

In the July number of the *New York Nursery and Childs Hospital Bulletin* the following paragraph is eloquent testimony of how the Club's work is appreciated by those best in a position to see the need.

The ladies of the International Garden Club at Ardsley-on-Hudson have given a very precious gift—twenty quarts of milk each day. This is Grade A milk, and is for the expectant mothers of our clinic and for undernourished babies. It is sold at the minimum price of nine cents a quart, but always given if the mothers cannot pay. We have only to tell of the gift for all to understand how welcome it is.

Notes on a Little-Known Group of Japanese Azaleas

*By E. H. Wilson**



S a class I think these "Kurume Azaleas" are the most beautiful of all pot Azaleas and it is remarkable that they should be so little known. The pink and salmon shades are most attractive but there are all shades of color save yellow, orange and green. Also, there are hose-in-hose as well as simple-flowered forms in all colors but no double-flowered ones. The habit of the plant is twiggy, and every twig bears its terminal clusters of about three flowers, and so abundant are the flowers that the leaves are often completely hidden.

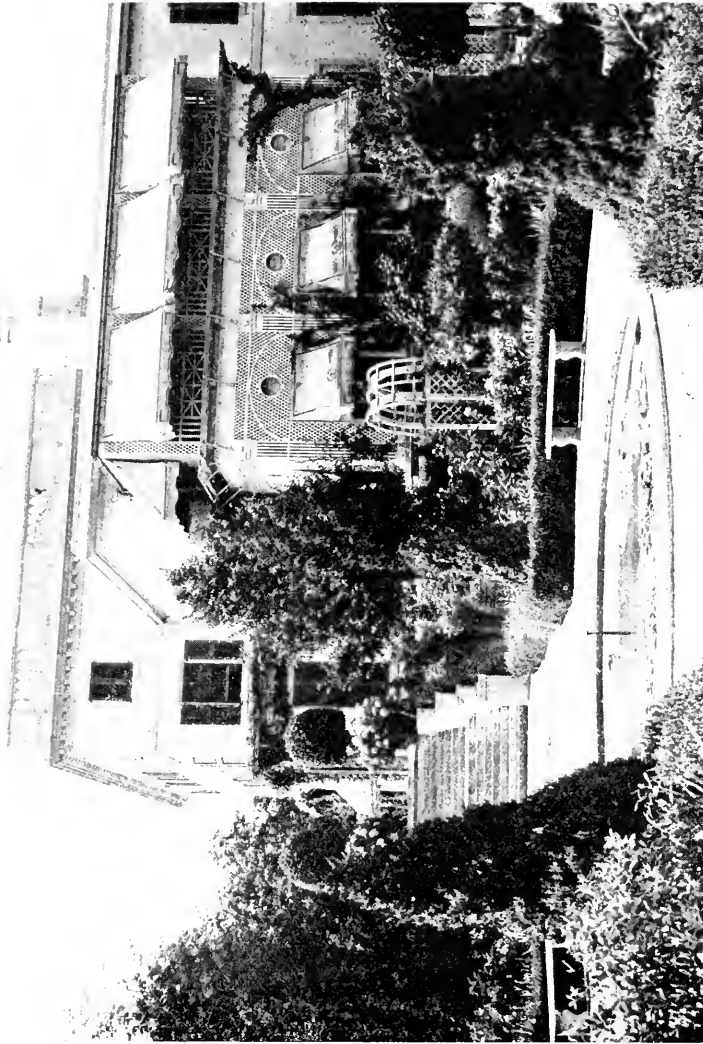
Their history—at least as much of it as can be learned—is simple. They were originated by a gentlemen named Sakamoto who lived at Kurume, a town in central Kyushu. The parents are said to have been brought from the sacred Mt. Kirishima about one hundred years ago. Whether Sakamoto himself brought them or some pilgrim gave them to him I could not ascertain. At any rate, Sakamoto cultivated several varieties and raised and selected seedlings including one he named "Azumakagami" from which is said to have descended all the pink-colored forms. . . . After his death Sakamoto's collection came into the hands of a Mr. Akashi who for the last forty years has assiduously devoted himself to the development of these Azaleas and has raised from seed nearly all the forms in cultivation. (The individual sorts are propagated by cuttings.)

*From a recent letter to Professor Sargent and kindly contributed by him.

Later their cultivation was taken up by other growers in Kurume and now the plants are also grown round Osaka and elsewhere in Japan. More than 250 named sorts are cultivated but the differences are often not apparent to the eye of the foreigner.

Accompanied by Mr. H. Suzuki, the head of the Yokohama Nursery Company, I visited Mr. Akashi's nursery and also the nurseries of all the principal growers in and round Kurume. Suzuki is an important figure in Japanese horticulture and we were most cordially received at every place visited. I made a list of the best varieties (43 in all), took some photographs and gathered all information possible. We then determined to visit the place tradition says the parents came from, so took a train soon after midnight and about nine o'clock the next morning arrived at a station some 15 miles from Mt. Kirishima. A local conveyance landed us in the evening at the foot of the mountain and the next morning after a couple of hours' climb we found the Azaleas in plenty. They grow in volcanic soil on windswept grassy slopes and among rocks. I had visited this mountain in early March 1914 and remembered that an Azalea grew there, but the plants were leafless and, though I gathered specimens, the species was conjectured. . . . This last time they were in flower but hardly two plants of the same shade of color. We gathered forms with pink, salmon, mauve to rich magenta-colored flowers; at a little higher altitude grow red-flowered forms but only a few blossoms were open; white is found mixed with red forms but is rare. Much variation is found in the size and shape of the flowers and leaves; also the anthers vary in color. With the variety of forms on the mountain we could accept as true the story of the origin of Kurume Azaleas as told me in the town of Kurume, for seedlings raised from such a variable species could easily give rise to all the known colors in the garden forms of this group today.

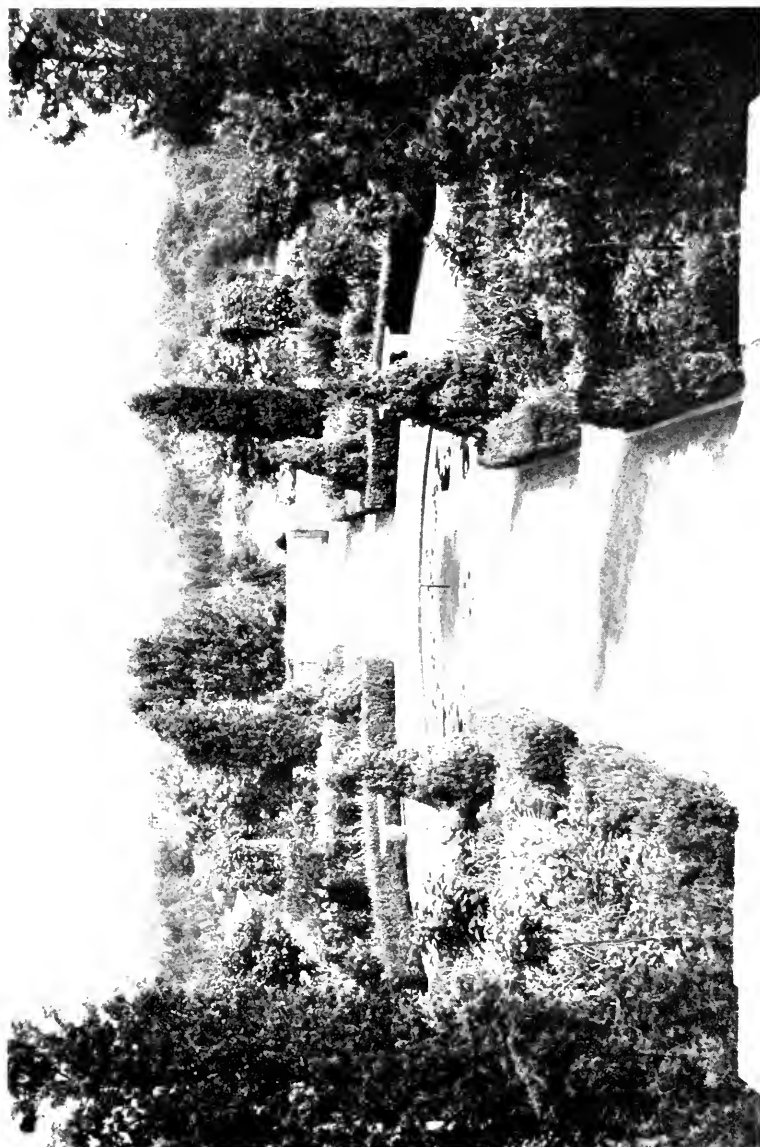
*Four Views of the Gardens at the Estate of
William Fahnestock, Esq.,
Katonah, New York*



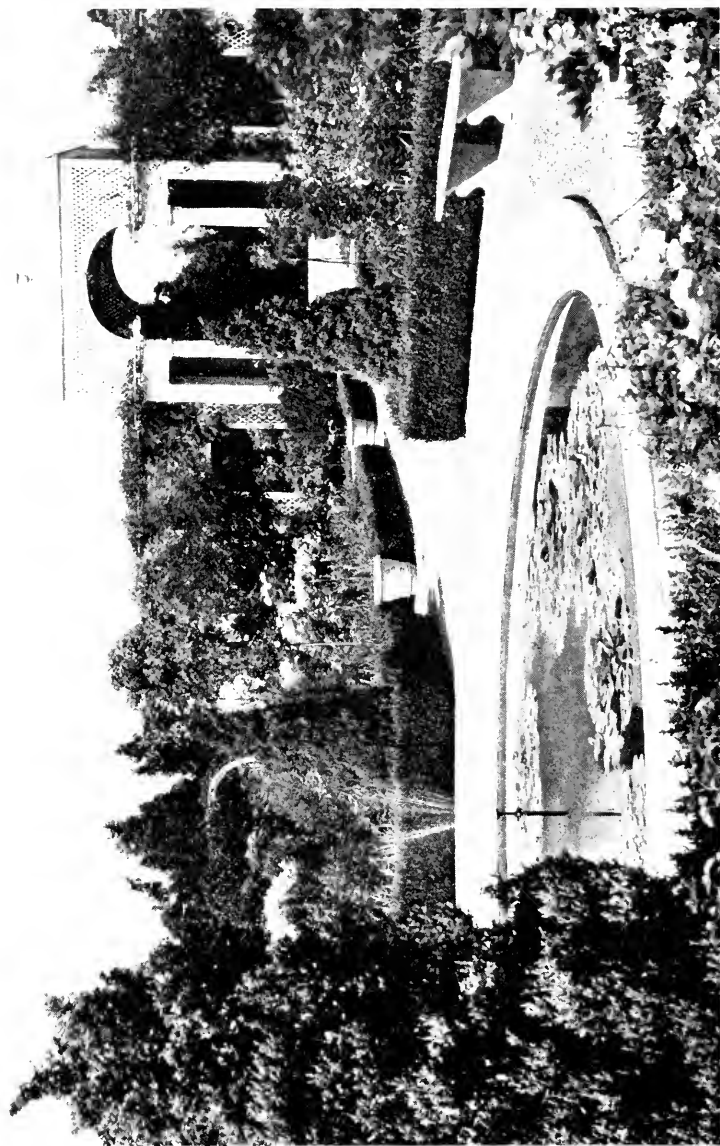
PLANTING AT POOL
AND STEPS LEADING
TO THE HOUSE



A CORNER OF THE
GARDEN NEAR THE HOUSE OF
W. FAINESTOCK, ESQ.



CHARMING VISTA OVER
THE WESTCHESTER HILLS
W. FAIRNESTOCK, ESQ., KATONAH



WATER LILIES IN THE
FORMAL GARDEN
W. FAHNESTOCK, ESQ., KATONAH.

Cycads

By G. H. Pring

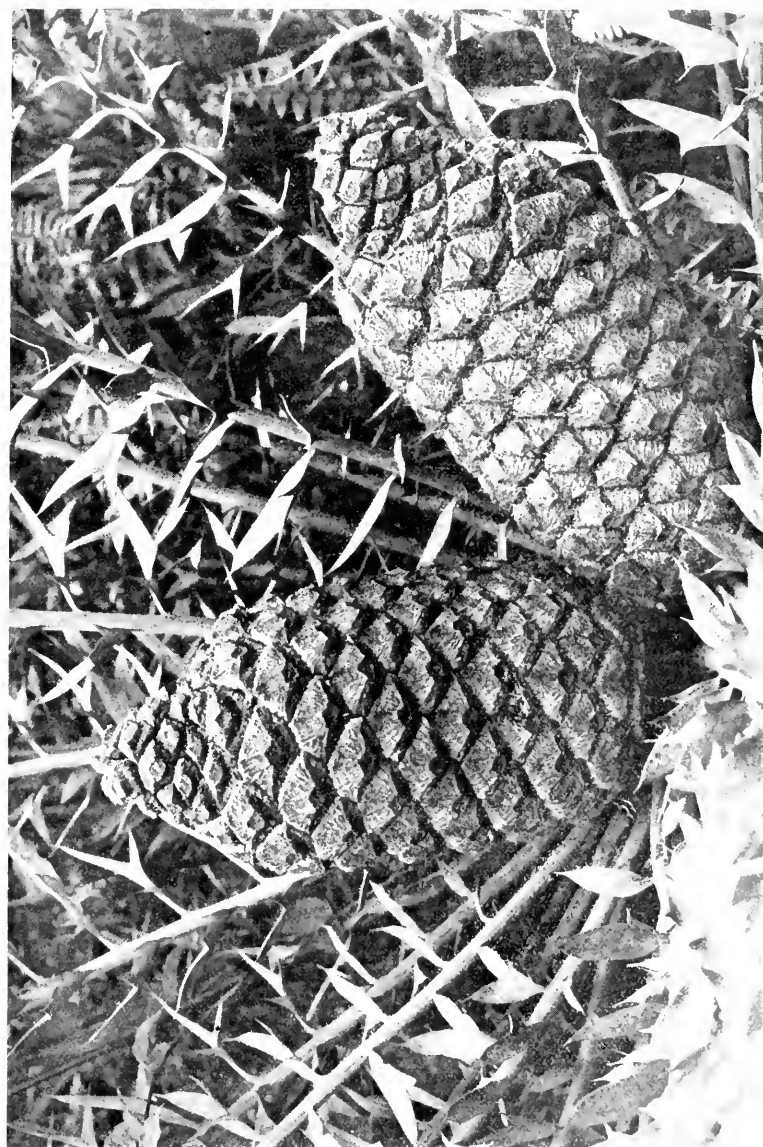


THE Cycadaceae is represented by nine genera including *Bowenia*, *Ceratozamia*, *Cycas*, *Dioon*, *Encephalartos*, *Macrozamia*, *Stangeria* and *Zamia*. Their geographical distribution in some cases is decidedly limited.

Geographical Distribution

The genus *Cycas* has the widest geographical distribution, including twenty-four species. *Cycas revoluta* is native of the Japanese Islands, *Cycas circinalis* of the Molucca Islands, *Cycas tonkinensis* of China, while other species are indigenous to the Indian archipelago, Australia and Madagascar. *Microcycas* is a monotypic genus of the order represented by *Microcycas calocoma*, which is native of the Sierras in western Cuba, and is known to the Cuban mountaineers as "Palma Corcho" being used as a rat poison. *Bowenia* is a unique genus represented by two species, limited to Queensland, Australia. It differs from all other genera in possessing the unusual character of bipinnate foliage. The genus *Dioon* is only represented by three species which are indigenous to Mexico.

Encephalartos is one of the largest genera of the family possessing about twenty described species native of tropical and southern Africa. *Stangeria* is a genus very rarely seen in gardens. It is a native of South Africa and practically limited to Natal, where it is represented by three species. *Zamia* is the largest genus of the family including about forty species, all native of tropical America and the West Indies. The northernmost limit is reached by *Zamia integrifolia* a native of Florida. *Ceratozamia* is closely allied to the *Zamia* and is a native of Mexico. It is represented by eight species inhabiting the



ENCEPIALARTOS HORRIDUS ♀

densely shaded portions of the Almolonga Valley. The genus *Macrozamia* includes fourteen species restricted to tropical and temperate Australia.

Cultivation

Cycads are not generally grown commercially by the florists, although leaves of the common *Cycas revoluta* are used to great extent for funeral designs. These are grown in Japan, dried, pressed and dyed, before being shipped to this country. Collections are usually found in private gardens, parks and botanical gardens. Specimen plants are frequently shipped from their native habitat by the aid of Wardian cases, when the entire plant, leaves, roots, etc., are so transported as to be kept growing during transit. Another method is the shipment of trunks dry in cases, the leaves being cut and the roots pruned before exporting. The Wardian case is the better of the two methods, providing specimen plants for immediate use are desired.

During 1913 a consignment of *Macrozamia*, *Cycas* and *Bowenia* was shipped from Australia to the Missouri Botanical Garden, taking about three months in transit. When the Wardian cases were opened the plants were found in excellent condition, soon establishing themselves under greenhouse treatment consisting of permanent planting in the house devoted to Cycads. When importations of defoliated trunks are received the main factor to be considered is the development of new growth. The trunks should be potted or tubbed, the size of the receptacles being governed by the plants, using a good porous sandy soil as a rooting medium. The pots should then be plunged into medium with bottom heat of 75°F. to 80°F. to help facilitate rooting, combined with an atmospheric temperature of 70°F. With careful watering, plants will establish themselves within a few months.

Established plants grow best when planted out in the free ground in a temperature of 60°F. to 65°F. As the new growth appears in the spring from February until May, heavy watering should be maintained until the completion of growth,

after which daily spraying will be sufficient. During the winter months watering may be considerably reduced, as the plants are partially resting but occasional spraying is essential to prevent scale and mealy bug.

Reproduction of Cycads may be accomplished by the bulb-like growths attached to the stem, the basal side shoots and seeds. The trunk growths may be removed when a convenient size is attained, rooting them in a similar manner as advocated for imported plants, using pure sand until sufficiently rooted to allow transplanting in sandy loam. The basal growths should not be segregated until they have sufficient roots to allow separation from the parent stem. If a stock of any particular variety is desired, an old plant may be decapitated and in the course of time young bulblets will appear around the parent stem. The top of the plant may be rooted forming a specimen plant. Germination of seeds is somewhat similar to that of palms in their requirement of long periods to soften the hard protective covering. Sand with plenty of bottom heat is the most desirable germinating medium. Considerable time is taken up in obtaining specimen plants from seeds, unless grown in the open ground.

Cycads are susceptible to insect pests, such as mealy bug and scale insects; especially to the large conical brown scale and the small circular hard black scale, the latter being extremely hard to remove when once established. Both of these are commonly called cycad scales owing to their preference for the group. When the plants are infested with these pests, applications of scalecide is the best means of eradication. The foliage of cycads will stand stronger applications than almost any other tropical evergreen, one ounce to the gallon not causing injury to the leaves providing dull weather prevails at the time of application. It is not advisable to use scalecide emulsion during the development of the whorls of young growth. The mealy hug is readily overcome by forcible spraying with water.



DIOON SPINULOSUM ♂

Missouri Botanical Garden Collection

One of the most complete collections in the country is growing in St. Louis. The north wing of the main conservatories is devoted to the family including eight of the nine described genera and thirty-four species. *Microcycas calocoma* the monotypic genus is not represented. *Bowenia serrulata* is the most noteworthy genus represented; its bipinnate foliage suggesting a large fern of the *Aspidium* type. It differs from the other genera entirely in the absence of a main stem or trunk. However, it forms a very large flat rhizomous root, from which the tall petioles are produced bearing the unique foliage three to four feet above the ground. Particular care is necessary when handling, otherwise the foliage will break off at the base. The specimens have not fruited since their importation from Australia during 1913.

Cycas is represented by *C. revoluta* ♀ ♂, *C. circinalis* ♀ ♂, *C. media* ♀ ♂, *C. Rumphii* ♂, and *C. tonkinensis* ♀. The pistillate forms of this genus do not produce ovules enclosed in cones as other genera, they are attached to white floral pubescent bracts, arranged in a central whorl, the individual bracts bearing two bright scarlet ovules. The seeds are valued economically by the natives, being collected and exposed to the sun for several weeks to dry. The kernels are then extracted and pounded in a mortar, into a flour or starchy substance, which is used by the forest tribes and poor classes in parts of India and Ceylon for edible purposes.

Dioon is the most complete genus including two of the three species indigenous to South America. Both staminate and pistillate forms of *Dioon edule* are represented. It is of a low growing type bearing pungent glaucous flat leaves. *Dioon spinulosum* is a much stronger growing type, the long pendant leaves measuring six feet in length. The cones are cylindrical and covered with a woolly pubescence. Three staminate plants are in the collection, which bear cones over two feet in height developing within two months from first indications of growth.

Encephalartos is the largest growing plant of the family and is commonly known as Kaffir bread. The genus is represented by *E. Altensteinii* ♂, *E. caffer* ♀, *E. elongatus* ♀, *E. Hildebrandtii* ♀, *E. horridus* ♀, *E. lanuginosus* ♂, *E. regalis* and *E. villosus* ♂. They are readily distinguished from the other cycads by their rigid spiny leaves and thick trunk. *Encephalartos caffer* is the largest specimen in the collection being approximately forty years old. The leaves measure nine feet in length, the maximum number produced in one season being twenty-four. The cones are produced during September taking two months to develop and measuring over two feet in height. It is apparent from the behaviour of these plants that considerable check is obvious before and after fruiting, which is indicated by the plants being dormant the year previous and the year after fruiting. For example *Encephalartos caffer* produced two leaves only during 1915, the following September 1916 two large cones appeared, ripening and shedding its pollen the latter part of December. *Encephalartos lanuginosus* produced seventeen leaves during September 1914, remaining dormant throughout 1915. In July 1915 six cones appeared, shedding its pollen in September. *Encephalartos horridus* produced two large cones in 1911 remaining dormant until 1916 when sixteen leaves developed. In 1916 it remained dormant. The pistillate cones take twice the time to develop compared with that of the staminate type, judging from the time the ovules are receptive to that of shedding pollen of the staminate cone. When pollinated the ovules will again become enclosed by the scales. This opening of the scales is an indication of the receptive period.

Zamia has the most representatives of the family including *Z. costaricensis* ♀, *Z. furfuracea* ♂, *Z. integrifolia* ♀ ♂, *Z. Loddigesii* ♀, *Z. media* ♀, and *Z. Van Houttei* ♂, also three unidentified species. The genus is recognized by its broad and somewhat pendant pinnae the absence of marginal spines on the leaves and the scales of the cones bearing a central horn-like appendage. *Zamia Loddigesii* is the largest specimen in the collection, bearing cones annually. Experiments have



ENCEPHALARTOS CAFFER ♂

been carried out at the garden, testing the length of time pollen will remain viable. One of the cones of this species was pollinated with pollen three months old, collected from *Ceratozamia mexicana longifolia*. The ovules were exposed and pollinated July 7th, the closing of the seeds on July 24 indicated fertilization. The cone remained intact until March 15, the following year producing 144 seeds of which only two were apparently fertile. Another cone of the same plant was pollinated with fresh pollen and after fertilization, the fruit had increased twice its size containing 142 seeds 78 of which were apparently fertile. Cycad pollen has been recorded as being viable as long as twelve months.

Ceratozamia is so closely allied to *Zamia* that it is impossible to distinguish them by their foliage. When in fruit they are easily differentiated by the bicornate horns attached to the scales whereas the *Zamia* has but one. The collection includes *Ceratozamia brevifrons* ♀ *C. robusta*, *C. mexicana* ♀ *C. mexicana longifolia* ♂, *C. Miqueliana* *C. robusta* ♀ *C. brevifrons robusta*, and *C. terrestris*. The two representative specimens are *C. mexicana* and its variety *longifolia*, the former being the largest specimen of the genus. Its leaves are eight feet long upon a trunk two feet in diameter. It has produced five cones during seven years averaging a foot in height. April 26, 1916 the cone was pollinated with pollen two weeks old of *C. mexicana longifolia*. The bright yellow ovules were inclosed by the scales May 25. A period of seven months was required before exposing the fertile seeds on November 27. During this period the cone had increased one-half its original size, containing 382 seeds, 90 of which were fertile. When the cones are fully developed the apical portion loosens first, the least jar causing the scales, combined with the two seeds attached, to fall to the ground, thus exposing the remaining closely packed seeds in whorls. In most cases the membranous seed covering is highly colored, losing its brightness with age. The staminate cones after dehiscing their pollen soon become black and collapse. When pollinating cycads the hybridist can readily perceive the receptive period of the pistillate cone by



CERATZAMIA MEXICANA ♀



COMMON SAGO PLANT
CYCAS REVOLUTA ♀

the opening of the scales. If the operation is successful the scales will again inclose the ovules, if not the cone will begin to shrivel and finally collapse.

Macrozamia is represented in the collection by *M. Moorei* ♀ ♂ *M. Paulo-Guilielmi*, and *M. spiralis* ♀ ♂. The species *M. Moorei* is particularly interesting from the evolutionary standpoint because of its representing the nearest approach to the Bennettiales, a group of fossil cycads existing in the Mesozoic era. These native plants at Springsure, Australia are rapidly being exterminated owing to the poisonous properties of the leaves, which cause paralysis to cattle that feed upon them. The plants are being poisoned by boring a hole in the center of the trunk and placing arsenic in it. To prevent the loss of this particular species to cultivation, plants were imported to the garden and also the Brooklyn Botanic Garden in 1913. Specimens attain a height of ten to twenty feet, bearing as many as a hundred leaves upon a trunk two to three feet in diameter, and as many as one hundred and three male cones, on a single unbranched plant, have been reported.

Stangeria paradoxa is rarely seen in cultivation. It is a small growing type somewhat resembling a *Zamia*. The venation is entirely different from that of other cycads. In other genera the veins of the leaf segments are parallel and horizontal, whereas in *Stangeria* they are unique in being all free connecting the midrib or central vein to the leaf margin.

The very recent donation of the collections of Mr. D. S. Brown to the Missouri Botanical Garden has added the following species:

Cycas siamensis, *C. Bellefontii*, *C. Micholitzii*, *Encephalartos Lehmanii* and *Maorozamia plumosa*, as well as an unusual specimen of *Cycas revoluta*, reputed to be three hundred years old, which was exhibited by the Japanese Government at the Pan-American Exposition in Buffalo in 1900.

Development of Young Growth

Name	Date	Number of Leaves	Length	Time
<i>Cycas media</i>	5/18 to 6/16	22	3' 8"	29 days
<i>Cycas revoluta</i> ♂.....	4/12 to 5/22	32	3' 1"	40 "
<i>Cycas Rumphii</i>	7/25 to 9/5	10	7'	41 "
<i>Dioon edule</i> ♀.....	4/21 to 5/22	22	3' 7½"	31 "
<i>Dioon spinulosum</i> ♂.....	5/25 to 6/16	21	6' 2"	22 "
<i>Encephalartos Hildebrandtii</i> ♀.....	7/17 to 9/13	5	8' 5 "	58 "
<i>Encephalartos horridus</i> ♀.....	4/12 to 5/22	16	2' 10"	41 "
<i>Encephalartos villosus</i> ♂.....	5/18 to 6/16	13	7' 3"	29 "

Missouri Botanical Garden.

Effects of the Winter of 1918

By John Dunbar



HE winter of 1917 and 1918 will be memorable to horticulturists and gardeners.

Many woody plants in gardens and parks in the north and northeastern States suffered severe injury, and in a number of instances were killed outright. It appears to the writer that coniferous and broad-leaved greens suffered much more severely than deciduous trees and shrubs.

The only winter in the past thirty-one years horticultural experience of the writer in this country, that was similar in severity was the winter of 1903 and 1904. The intense cold at that time was very steady from December to March but there was a heavy blanket of snow on the ground, therefore plants did not suffer in the same proportion as during the past winter.

The intensely cold period last winter was from the middle of December to the middle of February. After that conditions were normal. The lowest temperatures according to the local Weather Bureau were, on February 5 when it registered 11 degrees below zero and on December 30 last 8 degrees below zero. Two miles south of the center of the city in one of the public parks, and about 100 feet higher than the Weather Bureau office it registered 13 degrees below zero on both these dates. The average January temperature was 14.8 degrees.

The snowfall for December was 30 inches and in January 17 inches. The snow was well distributed and presented a fairly good protective mantle, and no doubt saved us from much more extensive injuries. That probably explains why some things were more severely injured in the vicinity of New York and in Long Island, than in the lower parts of the Genesee Valley, as the ground in that vicinity was barely covered with snow during the greater part of the winter.

There are perplexing conditions in the hardihood of plants that are sometimes difficult to explain. No doubt the cold and severely rainy conditions that prevailed last year unfitted many trees and shrubs on account of late growth and unripened wood to stand the winter, but I cannot quite understand how deciduous trees and shrubs did not relatively suffer as much as evergreens.

The number of shrubs and trees killed outright I am glad to say was not large and is as follows:

Killed outright

Pinus Lambertiana

Podocarpus japonica

Nandina domestica, protected (one plant is sprouting from base)

Poliothyrsis sinensis

Corylopsis platypetala

Cornus Wilsoniana. Two plants close together, one injured

Alangium platanifolium, protected

Prunus mira

Cercis siliquastrum (always partly injured)

Evodia hupehensis (of three trees, one killed outright, one killed back two-thirds, and the other all right)

Zelkova serrata (killed on low damp ground, but all right on high dry ground)

Pyrus Pashia

Celtis Smallii (One individual appears to be starting again from the base)

Euptelia Davidiana

Quercus Phellos. In one park one tree killed, in another it was partly injured

Daphne pontica

A number of trees and shrubs were so severely injured that they had to be pruned back, and in some instances had to be cut down to the ground. In this list we include a number of conifers. At the present time a number of them look badly,

and are making a feeble growth. On purely aesthetic grounds their removal would probably be the best policy, but there is a probability if they survive the next one or two winters, that they may in a few years time recover. In some instances though I am afraid it is very doubtful. This of course should be demonstrated.

Trees and shrubs severely injured, and amongst the shrubs, a number of them cut to the ground:

Conifers

Abies Nordmanniana
Abies numidica
Abies pectinata
Abies Cilicia
Abies cephalonica
Abies cephalonica var. Appolinis
Abies grandis
Picea orientalis
Tsuga Sieboldii
Torreya nucifera
Pinus Thunbergii
Pinus densiflora
Pinus tuberculata
Chamaecyparis Lawsoniana
Sequoia gigantea
Cephalotaxus drupacea
Libocedrus decurrens
Cryptomerea japonica var. Lobbii

Deciduous and Evergreen

Celtis mississippiensis
Carpinus Turczaninowii
Liquidambar formosana, protected
Cercis chinensis
Hovenia dulcis (always partly injured)
Prunus Pseudo-cerasus James H. Veitch

Prunus Pseudo-cerasus Watereri
Viburnum rhytidophyllum
Viburnum buddleifolium
Xanthoxylum Bungei
Ilex crenata
Ilex decidua
Cornus stricta
Lycium chinense
Ligustrum ovalifolium (killed to the ground everywhere)
Ligustrum Ibotia var. *Regelianum* (type not injured)
Davidia involucrata, protected
Grewia parviflora
Actinidia chinense, protected
Cytisus Scoparius
Diospyros Lotus, protected
Cotoneaster Franchetii
Cotoneaster amoena
Cotoneaster Simonsii
Cotoneaster rugosa
Berberis aggregata
Berberis dictyophylla
Berberis sub-caulialata
Berberis Prattii recurvata
Berberis verruculosa
Berberis Gagnepainii
Berberis Wilsonae
Rosa Gentiliana, protected
Rosa brunonis, protected
Rosa macrophylla, protected
Rosa caudata
Rosa multibracteata
Rosa Souliana

China roses as follows: Carman de Luc, Ducher, Abbe Mioland, Fellemborg, Common Blush, Cora, La Neige, Louis Phillippe. All of the above were protected. All climbing roses with *Rosa Wichuraiana* blood were killed to the ground.

In the next division we place a number of things where wood injury was only slight, and in some instances only the

flower buds were killed. Where the wood injury was not severe they are rapidly recovering.

Trees and shrubs slightly winter killed, or flower buds only, destroyed:

Conifers

Pinus Laricio

Pinus edulis

Pinus monophylla

Pinus strobiformis

Pinus Armandii

Taxus baccata in numerous varieties. It is important to note that the variety *repandens* showed practically no injury, and it seems to be about as hardy as *Taxus cuspidata*.

Deciduous

Hamamelis japonica, flower buds killed

Hamamelis japonica arborea, flower buds killed

Hamamelis mollis, flower buds killed

Corylopsis spicata, flower buds killed

Corylopsis pauciflora, flower buds killed

Lonicera fragrantissima

Lonicera Maackii variety *podocarpa*

Lonicera pileata

Cotoneaster buxifolia

Cotoneaster horizontalis

Cotoneaster microphylla

Cotoneaster rotundifolia

Cotoneaster salicifolia

Cornus paucinervis, flower buds killed

Wisteria sinensis, flower buds killed

Wisteria sinensis variety *alba*, flower buds partly killed

Wisteria floribunda variety *alba*, flower buds killed

DEUTZIA spp., hybrids and varieties. These all had slight wood injury, and a number of flower buds killed, but they all flowered more or less.

PHILADELPHUS: The recent hybrids with the flowers showing a rosy purple tinge at the base, and which are said to be the

result of crossing *P. Coulteri* with some of *P. Lemoinei* suffered from partial wood injury. Some of them however produced a few flowers. With this exception none of the *Philadelphus* hybrids were injured.

MAGNOLIAS: Amongst the different species and hybrids there was no wood injury. A number of the flower buds were killed, but enough escaped to make a noticeable display.

PAEONIA MOUTAN: A collection of well established plants of splendid varieties suffered considerable wood injury, but strange to say a collection of seedlings about seven years old, in close proximity suffered no injury.

RHODODENDRONS: It would seem strange perhaps in this paper if nothing was said about Rhododendrons. I must confess the Rhododendron situation is a complex one. There is here, a large collection of the *Catawbiense* hybrids and with a few exceptions they all suffered more or less, and in a number of cases, a variety or hybrid was practically killed, and the same variety or hybrid nearby would be partly injured. Some standard varieties that have a reputation for hardihood such as *Everestianum*, *atrosanguineum*, *Charles Dickens*, and *Kettledrum* suffered from considerable scorching. A number of the native *R. maximum* were badly scorched. *Boule de Neige*, *Memoir*, *Lady Armstrong*, seemed to come through in good condition. *Blandyanum*, *Giganteum*, *Madame Carvalho*, and *C. S. Sargent* were practically exterminated. Most of the hybrids however, that were badly scorched or suffered wood injury are now making a good growth,

AZALEAS: All of the species of American Azaleas and the so called Ghent hybrids came through the winter in excellent condition, and produced a splendid floral display. These grow in close proximity to the Rhododendrons and it is difficult to explain why they suffered no injury.

Rochester.



SHOOTING STAR
DODECATHEON MEADIA

The Use of Wild Plants in Ornamental Planting

By Alexander Lurie



N THE great abundance of native and foreign plant material which is commonly utilized for beautifying the landscape, the plants which are growing wild in the surrounding country are often overlooked. The fact that they are a common sight along the roads, in the fields, through the woods and along the creeks is often considered a detriment. Yet in naturalistic planting what is more appropriate than the use of material native and suitable to the region. A great ado is made of the possession of exotic plants and even monstrosities by enthusiastic gardeners but the numerous showy and useful plants which surround us are looked upon with scorn. Great pride is usually taken in the successful growing of foreign plants through various expedients of petting and painstaking care known to the skillful gardener, while the easily grown and readily adaptable native flowers are discarded as not worthy of attention. It is a pity that such a state of affairs should exist. So many city homes look gloomy and unattractive, so many suburban and country homes lack the finishing and enframing touches of nature, so many houses appear bare and unsightly because of the feeling that means of floral decoration are so costly and not to be afforded except by the well-to-do. Yet why cannot a school teacher of a country school undertake a short expedition with a class into the surrounding country and with a little judicious effort and very little time carefully dig up plants indigenous to the region and plant them around the school house making it attractive and instructive to the younger generation, instilling a spirit of reverence and appreciation of the beauties of nature instead

of destruction. This surely is one of the means of developing the usually latent artistic taste in the average boy or girl. Why cannot the house owner or tenant profitably spend a day with his family in the same pursuit, making his dwelling not merely a house but a home. To the uninitiated, it is surprising what a great deal of material may be collected and brought in during a day in a few baskets.

The one cause of failure and disappointment lies in the fact that the amateur collector uses little judgment in the selection of plants with regard to their suitability to the environment and growing conditions. No pains are taken to observe closely the conditions under which the plants thrive in the natural state. A common occurrence is to see moisture loving flowers placed in the driest of locations or the reverse; or to find shade loving things compelled to endure the scorching rays of the sun throughout the day; or to prepare a rich soil intended only for gross feeders, for plants growing among rocks or poor sandy soils; or to neglect the use of a summer or a winter mulch as the case may be, for plants naturally thriving only by such means. Proper observance of these various seemingly unimportant details may spell success and save countless disappointments and abandonment of further efforts.

It is true that all plants possess a certain amount of adaptive powers, which may be depended upon to aid the gardener in his efforts in naturalization. Dependence may be placed upon this quality providing it is correctly translated into the garden conditions. It must be remembered that at best gardening is not a natural process, and very few plants, receive the most ideal conditions, and it is only by application of common sense combined with knowledge of natural conditions and limits of plant adaptations that the skillful gardener achieves apparently magical results. The case of manure is the commonest of examples. It is used as an artificial aid to the growth and as a protection from drought or cold. There are many plants that thrive through its use, while others are injured by direct contact with it requiring it merely as a mulch. It is in such cases as this that discretion and caution must be exercised. The selections in the following pages include trees,



ILEX DECIDUA

Perennials.

BOTANICAL NAME.	COMMON NAME	HEIGHT	SEASON OF BLOOM	COLOR OF FLOWER	SOIL	ADAPTATION	REMARKS
<i>Allium stellatum</i>	—	15 in.	Sept. -Nov.	Purple	Light, rich	Sunny	Good rockery
<i>Anemone canadensis</i>	—	15 in.	May -June	White	Dry, well-drained	Sunny	Spreading type
<i>Argemone parviflorum</i>	—	4-5 ft.	Sept.	Yellow	Wet	Shady	Grows along streams. Foliage very showy
<i>Aster dumosus</i>	—	5 ft.	Aug. -Oct.	White	Medium	Sun or shade	Numerous white flowers-mass. Very desirable
<i>Aster ericoides</i>	—	3 ft.	Sept. -Nov.	White	Poor	Sun	Upright
<i>Aster laevis</i>	—	4 ft.	Sept. -Nov.	Blue	Light, rich	Sunny	Long flowers. Showy
<i>Aster oblongifolius</i>	—	2-2½ ft.	Sept. -Nov.	Blue	Light	Sunny	Spreading
<i>Aster patens</i>	—	2 ft.	Sept. -Nov.	Light blue	Poor, light	Shade	Branching, erect
<i>Aster turbinellis</i>	—	3½ ft.	Sept. -Nov.	Dark blue	Poor, light	and sun	Very branching pendulous.
<i>Boehmeria cylindrica</i>	—	2 ft.	Aug. -Sept.	Greenish	Wet	Shade and sun	One of the best for mass effect
<i>Camassia esculenta</i>	Wild Hyacinth	12 in.	April	Pale blue	Light, rich	Sun or shade	Foliage good along bogs
<i>Cimicifuga racemosa</i>	Black Cohosh	3-4 ft.	July -Sept.	White	Light, rich	Sunny	Good rockery. Very showy in spring
<i>Coreopsis tripteris</i>	—	5-6 ft.	Aug. -Oct.	Yellow	Medium	Sun or shade	Rockery Tall racemes
<i>Coreopsis verticillata</i>	—	15-18 in.	July -Oct.	Yellow	Medium	Sunny	Good for high effects
<i>Clematis Fremontii</i>	—	15-18 in.	June	Purple	Light soil	Sunny	Spreading. Mass of flowers
<i>Desmanthus illinoiense</i>	—	3½ ft.	June -Aug.	White	Light	Sunny	Rockery. Foliage and fruit very showy
<i>Dodecatheon Meadia</i>	Shooting Star	12-18 in.	April	Pink	Light, rich	Sunny	Foliage and fruit quite showy
						Sunny	Rockery

<i>Echinacea paradoxa</i>	Yellow Cornflower	2-3 ft.	June	Yellow	Poor	Sunny	Not quite as coarse as the commonly used <i>E. purpurea</i> . Quite showy. Very showy. Very showy.
<i>Eupatorium ageratoides</i> <i>E. coelestinum</i>	White Snakewort —	2-3 ft. 18 in.	Aug. -Sept. Aug. -Sept.	White Blue	Rich soil Rich soil	Shady Shade and sun	
<i>E. perfoliatum</i> <i>E. purpureum</i>	Thoroughwort Trumpet Weed	2-3 ft. 6-7 ft.	Aug. -Oct. Aug. -Oct.	White Purple	Wet Dry or wet	Sunny Partial shade	Good for streams Good for background effects
<i>Gillenia stipulata</i> <i>Helianthus mollis</i>	— —	2 ft. 3-4 ft.	June -Aug. Aug. -Oct.	White Yellow	Medium Poor	Sunny Sunny	A spreading plant. The best of the <i>Helianthus</i> . Should be used more.
<i>Hibiscus lasiocarpus</i>	—	4-5 ft.	July -Aug.	White and red	Wet and dry	Sunny	
<i>Hibiscus militaris</i>	—	3 ft.	July -Aug.	White and red	Wet and dry	Sunny	Foliage deeply cut
<i>Iresene paniculata</i> <i>Lythrum alium</i>	Ghost plant —	2-3 ft. 2½ ft.	Sept. -Nov. July -Aug.	White Blue	Medium Wet	Shade Partial shade	Fruit attractive Better plant than the commonly used <i>L. Salicaria</i>
<i>Mertensia virginica</i>	Blue Bell	1½ ft.	April -May	Blue	Sandy	Shady	In addition to attractiveness is useful as greens for culinary purposes
<i>Mimulus alatus</i>	—	2-3 ft.	Aug.	Pale blue	Wet, poor	Partial shade	Good for bogs. Very showy when properly grown
<i>Panicum virgatum</i> <i>Pentstemon digitalis</i> <i>Phlox divaricata</i>	— — —	3 ft. 2½ ft. 12 in.	— July Mar. -April	— White Blue	Medium Medium Poor	Sunny Sunny Partial shade	Good ornamental grass Good ground cover. Cultivation detrimental. Good for shrubby border.

BOTANICAL NAME	COMMON NAME	HEIGHT	SEASON OF BLOOM	COLOR OF FLOWER	SOIL	ADAPTATION	REMARKS
<i>Phlox amoena</i> <i>Polygonatum commutatum</i>	— Solomon's Seal	12 in. 3 ft.	May June - July	Pink White	Poor Rich soil	Sunny Partial shade	Very good Very showy flower, fruit and foliage. Should be used more
<i>Smilacina racemosa</i>	False Spikenard	2 ft.	June	White	Poor	Sunny	Attractive for red berries and flowers
<i>Scutellaria versicolor</i>	Skull Cap	2-3 ft.	June - July	Bright Blue	Rich	Shade or sun	Very showy
<i>Solidago latifolia</i> <i>S. petiolaris</i>	Golden Rod —	2 ft. 3-4 ft.	Aug. Sept.	Yellow Yellow	Rich Poor	Shady Sunny	The best of low ones for shade Upright, effective. A good tall one
<i>S. rigida</i> <i>S. sempervirens</i> <i>S. speciosa</i> <i>S. ulmifolia</i>	— — — —	3-4 ft. 3-4 ft. 3-4 ft. 2-3 ft.	Sept. Aug. Sept. - Oct. Aug.	Yellow Yellow Yellow Yellow	Light Medium Medium Medium	Sunny Sunny Sunny Sunny	A good tall one
<i>Spiraea Aruncus</i> <i>Steironema ciliatum</i> <i>Thalictrum dasycarpum</i>	Goat's Beard — Meadow Rue	3-4 ft. 2 ft. 3-4 ft.	July June - Aug. June - July	White Yellow White	Medium Medium Medium	Sunny Shady Sunny	Good. Branching Very showy
<i>Trillium declinatum</i> <i>Verbena canadensis</i>	— —	12-15 in. 12 in.	April May - on	White Blue	Rich light rich	Shady Sunny	Very showy Good ground cover, spreading. If flowers are cut, will bloom all summer. Cultivation is detrimental
<i>Vernonia Arkansasana</i> <i>Vernonia Lettermani</i> <i>Urtica latifolia</i> <i>Urtica grandiflora</i>	Ironweed — — Large Bellwort	4-5 ft. 2 ft. 2-3 ft. 12 in.	July July — April	Blue Blue — Yellow	Light, sand Light, sand Rich Rich	Sunny Sunny Sunny Shady	Should be used more Good ornamental grass Foliage is good

shrubs, vines and herbaceous perennials which abound in nature, are showy, ornamental and desirable from many points of view, but which are either rarely used in ornamental planting or not at all. In a great many cases they make fitting substitutes for the commoner plants seen in gardens and described in nursery and seed catalogues.

The following is a brief list of native herbaceous perennials which are at ready command for those who desire their effectiveness despite their lack in average gardens.

The host of trees available for ornamental planting would seemingly preclude the advisability of adding still others to the list for fear of confusing the ambitious amateur, who generally is already bewildered and uncertain of his choice. Yet a few trees stand out so prominently among our native flora and adapt themselves so admirably to conditions near their nativity that at least a brief mention needs to be made. When thinking of oaks, the white, red, scarlet, pin and one or two others are generally considered. Of course, oaks are to be recommended with caution because of the difficulty of transplanting because of their long tap rooting propensities, but when properly handled what is more desirable than the majestic Burr Oak (*Quercus macrocarpa*) with its rounded top of parti-colored foliage and its large mossy acorns. Another of the most abundant oaks of Missouri deserving of a wider use is the shingle oak (*Quercus imbricaria*). It is a medium sized, round headed, dense tree, particularly conspicuous for its large entire glossy leaves, which often remain all winter. Still another oak worthy of mention is the swamp white oak (*Quercus bicolor*). Its pyramidal form during the early stages and the broad top at maturity combined with its lustrous foliage make it a peer among specimen trees. The chestnut oak (*Quercus Muhlenbergii*) may also be added to the list.

To the list of Willows may be added *Salix humilis*, *Salix Wardii*, *Salix tristis*. The Prairie Willow (*S. humilis*) and the Dwarf Gray Willow (*S. tristis*) are very useful for quick low effects. They are so dwarf as to be really classed with shrubs and may be used for such a purpose. *S. humilis* reaches a



CLEMATIS FREMONTII

Shrubs

BOTANICAL NAME	COMMON NAME	HEIGHT	COLOR	TIME OF BLOOM	REMARKS
<i>Amorpha canescens</i>	Lead Plant	2- 3 ft.	Blue	June	Profuse fls. Dense growth.
<i>Baccharis halimifolia</i>	Groundsel tree	6 ft.		September	White fruit. Dark green foliage
<i>Benzoïn aestivale</i>	Spice Bush	8-10 ft.	Yellow	April	Aromatic foliage
<i>Cercis canadensis alba</i>	White Judas Tree	12 ft.	White	April	Rare, desirable
<i>Ceanothus americanus</i>	New Jersey Tea	3 ft.	White	June	Spreading. Profuse bloomer
<i>Cephalanthus occidentalis</i>	Buttonbush	5 ft.	White	July	
<i>Cornus alternifolia</i>	Dogwood	8 ft.	Yellow	June	Very distinct, with branches in layers
<i>Cyrilla. racemiflora</i>	Leatherwood	8 ft.	White		Lustrous foliage. Numerous fls.
<i>Hypericum prolificum</i>	St. John's Wort	3- 6 ft.			Lustrous foliage. Numerous fls.
<i>Hypericum densiflorum</i>		3- 6 ft.		July	Lustrous foliage. Numerous fls.
<i>Ilex decidua</i>	Holly (Deciduous)	12 ft.			Berries very attractive in winter
<i>Ilex verticillata</i>		6 ft.	Yellow	June	Red fruit, persistent and very attractive for mass
<i>Ptelea trifoliata</i>	Hop Tree	8-10 ft.			
<i>Rhamnus caroliniana</i>	Indian Cherry	8-10 ft.			Lustrous foliage, attractive black berries
<i>Rhus canadensis</i>	Fragrant Sumac	3- 4 ft.	Yellow	April	Banks
<i>Staphylea trifolia</i>	Bladdernut	6- 7 ft.	White	May	Attractive fruit
<i>Symphoricarpos occidentalis</i>	Wolfberry	2- 6 ft.			Drooping Habit
<i>Zanthoxylum Clava-Hercules</i>	Prickly Ash	15 ft.		June	

Missouri Botanical Garden.

height of 10 ft. while *S. tristis* rarely ever grows higher than 3-4 ft. *Salix Wardii* is a small tree reaching 30 ft. in height and may readily be substituted for the black willow.

The Cork Elm (*Ulmus racemosa*) cannot replace the particularly pleasing vase form of the American Elm or the stately shape of the Scotch Elm but it is an extremely useful narrow headed tree with pendulous winged branches attaining a height of 60-70 ft.

What has been said of trees applies even in a greater measure to the shrubby material which is so essential in every planting scheme. There is a sad want of variety amongst the shrubs used in the average garden. Faith is placed only in a few of the tried and true plants which in many cases are not even ornamental at their best. The great wealth of material available for the purpose is rarely known even by some of the professional planters. The brief accompanying list merely includes the native shrubs which are little used and are not often listed in nursery catalogues. This list does not by any means exhaust the desirable shrubs which may be found with a slight effort. It merely serves as a reminder of the good things close at hand waiting to be used in company with their more commonly cultivated relatives.

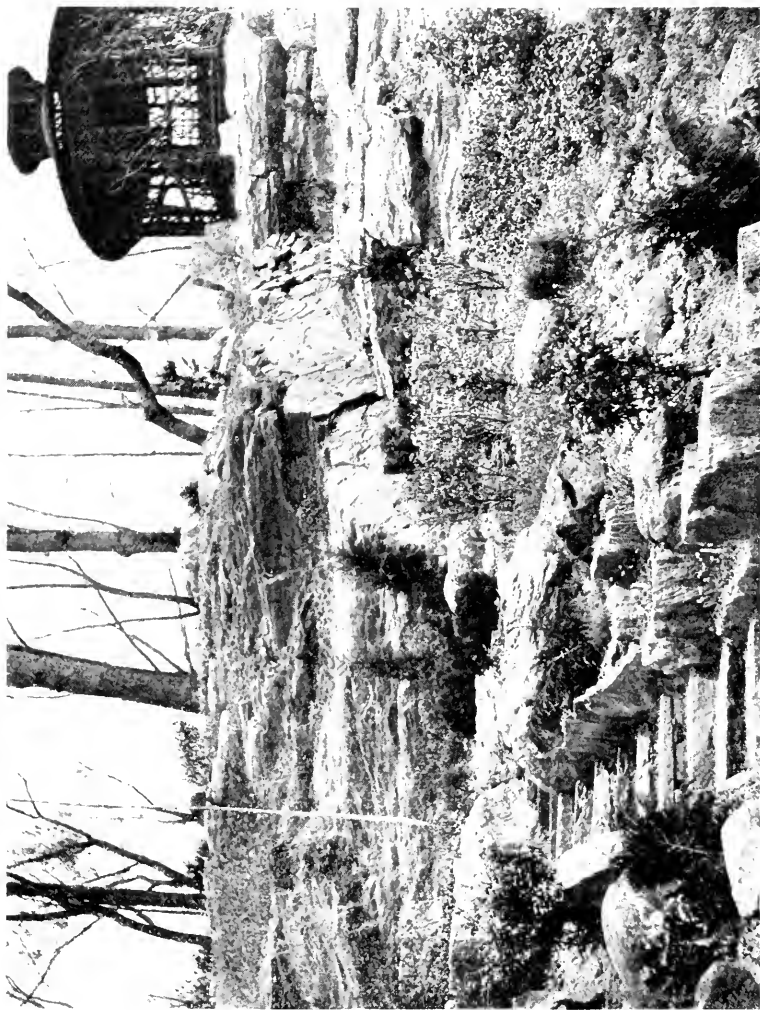
American Rock Gardens

By Richard Rothe



THE introduction of the rock garden has aroused keen interest particularly among nature-loving garden amateurs. That elaborate rock garden building on a large scale will have to be assigned chiefly to professional craftsmen is natural. I am, however, inclined to think that the small rockery as an enjoyable feature of suburban homes with moderate sized grounds will absorb the attention of the owner so that he will want to make it his personal concern. The incomparable vernal display of a host of showy plants, witnessed just after the departure of a long dreary winter, at a time, when our mind and vision is most receptive to floral beauty, exerts its influence. The natural consequence is that a number of enthusiasts become their own rock gardeners. As a striking instance of this we have the celebrated rock garden at a town in Bohemia, the richest Alpine plant treasury in Europe. There the owner, Ernest Count Silva Tarouca, not only was his own designer and builder but frequently even the collector, planter and caretaker of his mountain floral gems.

Rock gardening to many of us is still a new proposition, for we have rather vague ideas in regard to its nature and real meaning. Abstract definitions prove more or less misleading; to see clearly we have to ascertain the origin and the subsequent development of our object in view. There is no doubt that the heavy influx of Alpine plant material into the collections of Botanical Gardens during the nineteenth century, with the problems in regard to acclimatisation and adequate display for scientific study, caused the building of the first rockeries. Cultural requirements pertaining to soil condition, retention



ROCK GARDEN AT LINDENHURST
JOHN WANAMAKER, ESQ.
JENKINTOWN, PA.

of moisture, difference in exposure, and above all, the necessity for natural effect of these low-growing creeping and rambling mountain denizens, called for the rugged rock-receptacle of the distant hillside and plateau, from whence they were taken. The botanical gardens of Europe and especially the Royal Botanic Garden at Kew are famed for their large and beautiful collections of alpiners. Mountaineering and the life in mountain resorts, during the last twenty-five years, brought about a more intimate acquaintance with the beauty of the flora within the different regions of high altitude. This has perhaps done more in popularizing the rock garden, particularly among nature lovers, than all the previous writings and publications on the subject. There is no doubt that Great Britain has been the leader in Europe. Exceptionally favorable climatic conditions, a high standard of training and subsequent efficiency of her professional men, and an innate love for plants and flowers as a distinct attribute of her cultured classes, are the underlying reasons for this state of affairs. The rock gardeners of continental Europe more strictly adhere to alpine plant material than those of the British Islands do. The conception *alpine* in this case however does not mean exclusively natives of the Alps, but in its present application it embraces suitable subjects for rockeries from the floras of mountainous regions all over the world.

The study of the origin and brief history of the rock garden enables us to see plainly that the principal purpose of the stone construction is to serve as a receptacle for the display of the enchanting beauty of plant material which inhabits mostly mountainous districts. When deciding on a location, we may be told that a rock garden can only be appropriately placed and introduced on large estates where the natural ground formation adapts itself so well that we can make it appear part of the landscape. From another section we hear that for rock garden building we ought to have a natural ravine with a little brook running through it. And finally we may learn from one who knows it all, that without an old abandoned quarry hole, to build in, we should leave rock gardening alone. These suggested



SHADED PATH IN
ROCK GARDEN AT
LINDENHURST



AUTHOR'S ROCK GARDEN
GLENSIDE, PA.

locations one must readily admit are the most ideal for work; the only serious trouble is that they are extremely rare. If the American rock garden is to depend solely on ideal natural ground formation we are not going to make any noticeable headway with it. During the last two years a friend, who, as a lover of nature and the beautiful, contemplated building and enjoying a rock garden. Having a clear idea of the work he gradually succeeded in transforming a very unsightly slope back of his house into a rock garden radiant in brilliancy from April until July, and throughout the rest of the season by no means lacking in interest. This rockery, while in no way part of any landscape scheme, simply represented the object of beautifying a comparatively small suburban lot, just as a strikingly beautiful oil canvass may figure as the dominant ornament in the library or sitting room of an art enthusiast.

The design and building of the stone-work of a rock garden pre-supposes a keen eye for the elements of beauty in rocks and natural rock formation. In this faculty the Japanese, in their gardens, display remarkable mastery. The American rock garden, if it is to be anything true to name, however, brings the imperative necessity of first of all taking our lessons from Nature. It also leads to the study of the character of our native mountain flora as an essential part for the work of effective arrangement of plantations. The author of this article during his seven years connection with the Mount Desert Nurseries at Bar Harbor, Maine, had an opportunity to study Mount Desert Island, well known as one of the most interesting and instructive of Natures own rock gardens in this country. The Adirondack, Blue and Allegheny mountains with their thickets of native laurels and *Rhododendron* growth are rich in suggestive details for prospective rock garden builders. But let us not forget that the granite, cliff-bound shore lines, the formation of the ledgy mountain plateau and the picturesque rock-strewn ravine are object lessons valuable chiefly for character study of the beauty of our native landscape. Only subtlety of vision in regard to general characteristics of the formation and vegetation of our mountain regions



ROCK GARDEN OF
JOHN S. MELCHER, ESQ.
NORTHEAST HARBOR, ME.

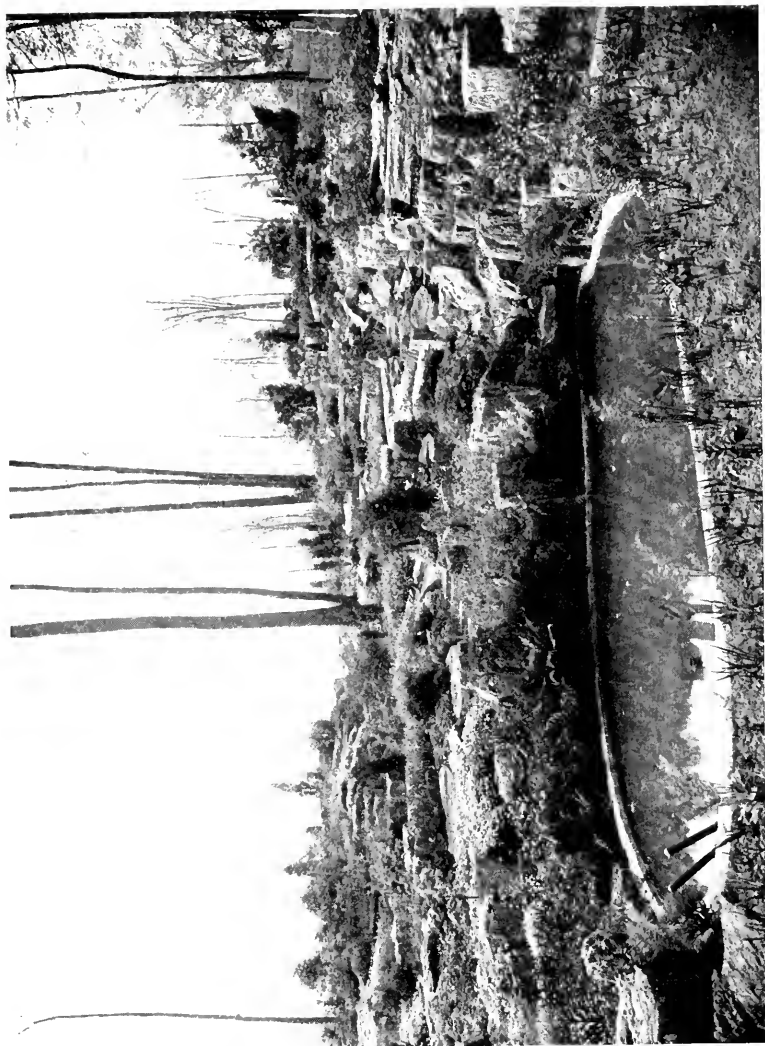
will qualify us to do satisfactory work in American rock garden building.

Looking at the pictures depicting the bare rock construction for the rock garden at "Lindenhurst" near Jenkintown, Pa. the reader can see what may be accomplished with large sized rough-quarried stones. For building on or near level ground the large field-boulder effect, in my opinion, seems the most appropriate and the simplest to arrange. Here the illustration of the small rockery of John S. Melcher, Esq. in Northeast Harbor, Maine is an admirable interpretation of the idea. For the construction of my own rock garden at Glenside, Pa., I used mostly yellow flint stones taken out of a nearby creek. Yellow flint rocks I recommend especially for rock garden operations on open rolling lawn expanses and in connection with brook, pool, and pond effects.

No other garden form and design leaves the latitude for originality in conception as the rock garden does. Regardless of size and situation, there are always interesting and for the lover of nature alluring problems to solve. Practical experience, no doubt is a valuable asset, nevertheless, for dodging mediocrity the faculty of conceiving the beautiful side of a thing and a loving interest in the work seem to me the leading factors.

In rock garden building it is an advantage if we can complete the construction work during the autumn months and have everything prepared for early spring planting. In regard to exposure of a rock garden we want all the light we can get. Throughout the Middle Atlantic States, however, the slope facing east and southeast is preferable, while the south—and particularly the southwesterly incline, on account of the hot afternoon sun, is trying for some rock garden inmates.

The preparation of soil, the description and enumeration of the plant material together with the arrangement of plantations for floral color effects is a subject by itself, which, I believe, is better treated in a separate article. But at this writing I cannot omit pointing out the importance of a proper back-ground for a rockery. In selecting the trees and shrubs



ROCK GARDEN AT
LINDENHURST
JENKINTOWN, PA.

for back-ground and flanking we aim to accentuate the natural character of a rockery. Native evergreens, birches, dogwoods, hawthorns, shrubbery, and in partially shady situations rhododendrons and *Kalmia latifolia* give a very satisfactory combination. For the purpose of enriching the early brightness of the whole we may add some Forsythias and magnolias. The point is however to avoid the conventional effect of the flowering shrub border of everyday planting.

The near future will bring our leading garden architects and landscape gardeners face to face with the task of establishing an artistic standard for the American rock garden. Our native mountain flora is exceptionally rich in valuable plant material. Our leading hardy plant firms, anticipating the trend of the times, carry well selected assortments of rock garden subjects on their lists. Some of the more delicate and capricious alpine, of course, we shall be obliged to exclude, but the majority of foreign species offered for rock gardens is well adapted to our climate. There is no reason why the artistic beauty of our rockeries should not be fully up to that of the best creations abroad. There is a strong contingent of nature loving, active enthusiasts among us endowed with some ingenuity and these should be encouraged to try rock gardening as among the most interesting and enjoyable of outdoor occupations.

Paradisi in Sole Paradisus Terrestris

By John Parkinson

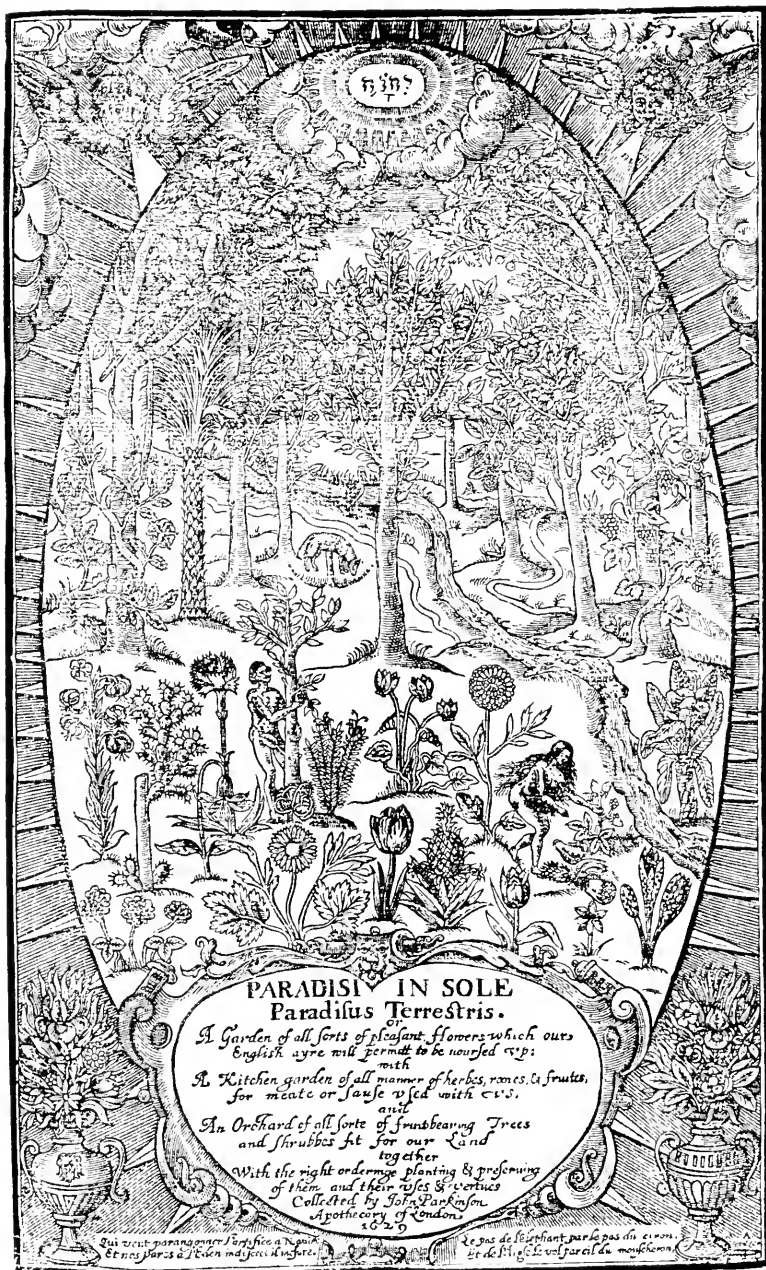
The reprinting of some of John Parkinson's *Paradisi in Sole Paradisus Terrestris*, nearly 300 years after it was printed, merely brings again to our attention how much our gardening is rooted in that of seventeenth century England. After the title-page and dedication reproduced herewith, there follows a preface "to the courteous reader" and then several long appreciations of the author by his contemporaries, in Latin. Parkinson divides his book into four main divisions, the first the "Ordering of the Garden of Pleasure," some of which is reprinted here, and the second "The Garden of Pleasant Flowers" which takes up most of the volume. After this comes a section on "The Ordering of the Kitchen Garden," followed by a final section on the orchard. This British gardening classic, printed in 1629, is a fascinating volume for any gardener to own. Original copies are hard to get, but Methuen & Co. of London made a photographic reprint of the book in 1904, and it is from this copy that our excerpt has been taken.—Ed.

CHAPTER I

*The fituation of a Garden of pleafure, with the nature of foyles,
and how to amend the defects that are in many forts
of fituations and grounds*



THE feuerall fituations of mens dwellings, are for the moft part vnauoideable and vnremouable; for moft men cannot appoint forth fuch a manner of fituation for their dwelling, as is moft fit to auoide all the inconueniences of winde and weather, but muft bee content with fuch as the place will afford them; yet all men doe well know, that fome fituations are more excellent than others: according therfore to the feuerall fituation of mens dwellings, fo are the fituations of their gardens alfo for the moft part. And although diuers doe diuerfly preferre their owne feuerall places which they haue chofen, or wherein they dwell; as fome thofe places that are neare vnto a riuier or brooke to be left for the pleafantneffe of the water, the eafe of tranfportation



TITLE PAGE OF PARKINSON'S
 PARADISI IN SOLE PARADISUS
 TERRESTRIS

of themfelues, their friends and goods, as alfo for the fertility of the foyle, which is feldome bad neare vnto a riuers fide; And others extoll the fide or top of an hill, bee it fmall or great, for the proſpects fake; And againe, fome the plaine or champian ground, for the euen leuell thereof: euery one of which, as they haue their commodities accompanying them, for haue they alfo their difcommodities belonging vnto them, according to the Latine Prouerbe, *Omne commodum fert fuum incommodum*. Yet to fhew you for euerie of theſe fituations which is the fitteſt place to plant your garden in, and how to defend it from the iniuries of the cold windes and froſts that may annoy it, will, I hope, be well accepted. And firſt, for the water fide, I fuppoſe the North fide of the water to be the beſt fide for your garden, that it may haue the comfort of the South Sunne to lye vpon it and face it, and the dwelling houſe to bee aboute it, to defend the cold windes and froſts both from your herbes, and flowers, and early fruits. And ſo likewiſe I iudge for the hill fide, that it may lye full open to the South Sunne, and the houſe aboute it, both for the comfort the ground ſhall receiue of the water and raine defcending into it, and of defence from winter and colds. Now for the plaine leuell ground, the buildings of the houſe ſhould be on the North fide of the garden that ſo they might bee a defence of much ſufficiency to ſafe-guard it from many iniurious cold nights and days which elſe might ſpoyle the pride thereof in the bud. But becauſe euery one cannot ſo appoint his dwelling, as I here appoint the fitteſt place for it to be, euery ones pleaſure thereof ſhall be according to the ſite, coſt, and endeauiours they beſtow, to cauſe it come neareſt to this proportion, by ſuch helpes of bricks or ſtone wals to defend it, or by the helpe of high growne and well ſpread trees, planted on the North fide thereof, to keepe it the warmer. And euery of theſe three ſituations, hauing the faireſt buildings of the houſe facing the garden in this manner before ſpecified, beſides the benefit of ſhelter it ſhall haue from them, the buildings and roomes abutting thereon, ſhall haue reciprocally the beautifull proſpect into it, and haue both ſight and ſent of whatſoeuer is excellent, and worthy to

giue content out from it, which is one of the greateft pleasures a garden can yeeld his Mafter. Now hauring fhewed you the beft place where this your garden fhould be, let me likewife aduife you where it fhould not be, at leaft that it is the worft place wherein it may be, if it be either on the Weft or Eaft fide of your houfe, or that it ftand in a moorifh ground, or other vnwholsome ayre (for many, both fruits, herbes, and flowers that are tender, participate with the ayre, taking in a manner their chiefeft thriuing from thence) or neare any common Lay-ftalles, or common Sewers, or elfe neare any great Brew-houfe, Dye-houfe, or any other place where there is much fmoake, whether it be of ftraw, wood or efpecially of fea-coales, which of all other is the worft, as our Citie of London can giue prooffe fufficient, wherein neither herbe nor tree will long prosper, nor hath done euer fince the vfe of fea-coales beganne to bee frequent therein. And likewife that it is much the worfe, if it bee neare vnto any Barnes or Stacks of corne or hey, becaufe that from thence will continually with the winde bee brought into the garden the ftrawe and chaffe of the corne, the duft and feede of the hey to choke or pefter it. Next vnto the place or fituation, let mee fhew you the ground, or foyles for it, eyther naturall or artificiall. No man will deny, but the naturall blacke mould is not only the fatteft and richeft, but farre exceedeth any other either naturall or artificiall, as well as in goodneffe as durability. And next thereunto, I hold the fandy loame (which is light and yet firme, but not loofe as fand, nor ftiffe like vnto clay) to be little inferiour for this our Garden of pleasure; for that it doth caufe all bulgous and tuberous rooted plants to thriue fufficiently therein, as likewife all other flower-plants, Rofes, Trees, etc. which if it fhall decay by much turning and working out the heart of it, may foone be helped with old ftale manure of horfes, being well turned in, when it is old and almoft conuerted to mould, Other grounds, as chalke, fand, grauell, or clay, are euery of them more or leffe fertill or barren than other; and therefore doe require fuch helpes as is moft fit for them. And thofe grounds that are ouer dry, loofe, and duftie, the manure

of ftall fedde beafts and cattell being buried or trenched into the earth, and when it is thorough rotten (which will require twice the time that the ftale foyle of horfes will) well turned and mixed with the earth, is the beft foyle to temper both the heate and drineffe of them. So contrariwife the ftale dung of horfes is the beft for cold grounds, to giue them heate and life. But of all other forts of grounds, the ftiffe clay is the very worft for this purpose; for that although you should digge out the whole compaffe of your Garden, carry it away, and bring other good mould in the ftead thereof, and fill vp the place, yet the nature of that clay is fo predominant, that in a fmall time it will eate out the heart of the good mould, and conuert it to its owne nature, or very neare vnto it: fo that to bring it to and good, there muft bee continuall labour beftowed thereon, by bringing into it good ftore of chalke, lime, or fand, or elfe afhes eyther of wood or of fea-coales (which is the beft for this ground) well mixed and turned in with it. And as this ftiffe clay is the worft, fo what ground foeuer commeth neareft vnto the nature thereof, is neareft vnto it in badneffe, the fignes whereof are the ouermuch moyfture thereof in Winter, and the much cleauing and chapping thereof in Summer, when the heate of the yeare hath confumed the moyfture, which tyed and bound it faft together, as alfo the ftiffe and hard working therein: but if the nature of the clay bee not too ftiffe, but as it were tempered and mixed with fand or other earths, your old ftale foyle of horfes will helpe well the fmall rifting or chapping thereof, to be plentifully beftowed therein in a fit feafon. Some alfo do commend the cafting of ponds and ditches, to helpe to manure thefe ftiffe chapping grounds. Other grounds, that are ouermoift by fprings, that lye too neare the vpper face of the earth, befides that the beds thereof had need to be laid vp higher, and the allies, as trenches and furrowes, to lye lower, the ground it felfe had neede to haue fome good ftore of chalkeftones beftowed thereon, fome certaine yeares, if it may be, before it be laid into a Garden, that the Winter frofts may breake the chalke fmall, and the Raine diffolue it into mould, that fo they may bee well mixed together, than which, there is not any better manure to

foyle such a moist ground, to helpe to dry vp the moyfture, and to giue heate and life to the coldnesse thereof, which doth alwayes accompany these moist grounds, and also to caufe it abide longer in heart than any other. For the sandy and grauelly grounds, although I know the well mollified manure of beasts and cattell to be excellent food, yet I know also, that some commend a white Marle, and some a clay to be well spread thereon, and after turned thereinto: and for the chalkie ground, *è conuerfo*, I commend fatte clay to helpe it. You must vnderstand, that the lesse rich or more barren that your ground is, there needeth the more care, labour, and cost to bee bestowed thereon, both to order it rightly & so to preseue it from time to time, for no artificial or fore't ground can endure good any long time, but that within a few yeares it must be refreshed more or lesse, according as it doth require. Yet you shall likewise vnderstand, that this Garden of pleasure stored with these Out-landish flowers; that is, bulbous and tuberous rooted plants, and other fine flowers, that I haue hereafter described, and assigned vnto it, needeth not so much or so often manuring with foyle, &c. as another Garden planted with other sorts of English flowers, or a Garden of ordinary Kitchen herbes doth. Your ground likewise for this Garden had neede to bee well cleaned from all annoyances (that may hinder the well doing or prospering of the flowers therein) as stones, weedes, rootes of trees, bushes, &c. and all other things cumbersome or hurtfull; and therefore the earth being not naturally fine enough of it selfe, is vsed to bee sifted to make it the finer, and that either through a hurdle made of sticks, or lathes, or through square or round sieues platted with fine and strong thin sticketes, or with wyers in the bottome. Or else the whold earth of the Garden being couered, may be cast in the same manner that men vse to try or fine sand from grauell, that is, against a wall; whereby the courser and more stony, falling downe from the fine, is to be taken away from the foote of the heape, the finer sand and ground remaining still aboue and on the heape. Or else in want of a wall to cast it against, I haue seene earth fined by it selfe in this manner: Hauing made the floore or vpper part of a large plat of ground cleane from stones,

&c. let there a reafonable round heape of fine earth be fet in the midft thereof, or in ftead thereof a large Garden flower-pot, or other great pot, the bottome turned upwards, and then poure your courfe earth on the top or head thereof, one fhouell full after another fomewhat gently, and thereby all the courfe ftuffe and ftones will fall downe to the bottome round about the heape, which muft continually be carefully taken away, and thus you make may your earth as fine as if it were caft againft a wall, the heape being grown great, feruing in ftead thereof. Thofe that will not prepare their grounds in fome of thefe manners aforefaid, fhall foone finde to their loffe the neglect thereof: for the trafh and ftones fhall fo hinder the encrease of their roots, that they will be halfe loft in the earth among the ftones, which elfe might be faued to ferue to plant wherefoeuer they pleafe.

CHAPTER II

The frame or forme of a Garden of delight and pleafure, with the feuerall varieties thereof

Although many men muft be content with any plat of ground, of what forme or quantity foeuer it bee, more of leffe, for their Garden becaufe a more large or conuenient cannot bee had to their habitation: Yet I perfwade my felfe, that Gentlemen of the better fort and quality, will provide fuch a parcell of ground to bee laid out for their Garden, and in fuch conuenient manner, as may be fit and anfwerable to the degree they hold. To prefcibe one forme for euery man to follow, were too great prefumption and folly: for euery man will pleafe his owne fancie, according to the extent he defigneth out for that purpofe, be it orbicular or round, triangular or three fquare, quadrangular or foure fquare, or more long than broad. I will onely fhew you here the feuerall formes that many men haue taken and delighted in, let euery man chufe which him liketh beft, or may moft fitly agree to that proportion of ground hee hath fet out for that purpofe. The orbicular or round forme is held in it owne proper exiftence to be the moft abfolute forme, containing within it all other formes whatfoeuer; but



TO
THE QVEENES
MOST EXCELLENT
MAIESTIE.

Madame,



Knowing your Maiestie so much delighted with all the faire Flowers of a Garden, and furnished with them as farre beyond others, as you are eminent before them; this my Worke of a Garden, long before this intended to be published, and but now only finished, seemed as it were destined, to bee first offered into your Highnesse hands, as of right challenging the proprietie of Patronage from all others. Accept, I beseech your Maiestie, this speaking Garden, that may informe you in all the particulars of your store, as well as wants, when you cannot see any of them fresh vpon the ground: and it shall further encourage him to accomplish the remainder; who, in praying that your Highnesse may enjoy the heauenly Paradise, after the many yeares fruition of this earthly, submitteth to be

Your Maiesties

in all

humble deuotion,

IOHN PARKINSON.

few I thinke will chuse such a proportion to be ioyned to their habitation, being not accepted any where I think, but for the generall Garden to the Vniuersity at Padoa. The triangular or three square is such a forme also, as is feldome chosen by any that may make another choise, and as I thinke is onely had where another forme cannot be had, necessitie constrainging them to be therewith content. The foure square forme is the most vsually accepted with all, and doth best agree to any mans dwelling, being (as I said before) behinde the house, all the backe windowes thereof opening into it. Yet if it bee longer than the breadth, or broader than the length, the proportion of walkes, squares, and knots may be soon brought to the square forme, and to be so cast, as the beauty thereof may bee no lesse than the foure square proportion, or any other better forme, if any be. To forme it therefore with walks, crosse the middle both waies, and round about it also with hedges, with squares, knots and trayles, or any other worke within the foure square parts, is according as euery mans conceit alloweth of it, and they will be at the charge: For there may be therein walkes eyther open or close, eyther publike or priuate, a maze or wilderneffe, a rocke or mount, with a fountaine in the midst thereof to conuey water to euery part of the Garden, eyther in pipes vnder the ground, or brought by hand, and emptied into large Cisternes or great Turkie Iarres, placed in conuenient places, to serue as an ease to water the nearest parts thereunto. Arbours also being both gracefull and necessary, may be appointed in such conuenient places, as the corners, or else where, as may be most fit, to serue both for shadow and rest after walking. And because many are desirous to see the formes of trayles, knots, and other compartments, and because the open knots are more proper for these Out-landish flowers; I haue here caused some to be drawne, to satisfie their desires, not intending to cumber this worke with ouer manie, in that it would be almost endlesse, to expresse to many as might bee conceiued and set downe, for that euery man may inuent others farre differing from these, or any other can be set forth. Let euery man therefore, if hee like of these, take what may please his mind, or out of these or his own

conceit, frame any other to his fancy, of caufe others to be done as he liketh beft, obferuing this *decorum*, that according to his ground he do caft out his knots, with conuenient roome for allies and walkes; for the fairer and larger your allies and walkes be, the more grace your Garden fhall haue, the leffe harme the herbes and flowers fhall receiue, by paffing by them that grow next vnto the allies fides, and the better fhall your Weeders cleane both the beds and the allees.

CHAPTER III

The many forts of herbes and other things, wherewith the beds and parts of knots are bordered to fet out the forme of them, with their commodities and difcommodities

It is neceffary alfo, that I fhew you the feuerall materials, wherewith thefe knots and trayles are fet forth and bordered; which are of two forts: The one are liuing herbes, and the other are dead materials; as leade, boords, bones, tyles, &c. Of herbes, there are many forts wherewith the knots and beds in a Garden are vfed to bee fet, to fhew forth the forme of them, and to preferue them the longer in their forme, as alfo to be as greene, and fweete herbes, while they grow, to be cut to perfume the houfe, keeping them in fuch order and proportion, as may be moft conuenient for their feuerall natures, and euery mans pleafure and fancy: Of all which, I intend to giue you the knowledge here in this place; and firft, to begin with that which hath beene moft anciently receiued, which is Thrift. This is an euerliuing greene herbe, which many take to border their beds, and fet their knots and trayles, and therein much delight, becaufe it will grow thicke and bufhie, and may be kept, being cut with a paire of Garden fheeres, in fome good handfome manner and proportion for a time, and befides, in the Summer time fend forth many fhort ftalkes of pleafant flowers, to decke vp an houfe among other fweete herbes: Yet thefe inconueniences do accompany it; it will not onely in a fmall time ouergrow the knot or trayle in many places, by growing fo thicke and bufhie, that it will put out the forme fo a knot in many places: but alfo

much thereof will dye with the frosts and snowes in Winter, and with the drought in Summer, whereby many voide places will be feene in the knot, which doth much deforme it, and muſt therefore bee yearly refreſhed: the thickneſſe alſo and buſhing thereof doth hide and fhelter ſnayles and other ſmall noyſome wormes ſo plentifully, that Gilloflowers, and other fine herbes and flowers being planted therein, are much ſpoyled by them, and cannot be helped without much induſtry, and very great and daily attendance to deſtroy them. Germander is another herbe, in former times alſo much uſed, and yet alſo in many places; and becauſe it will grow thicke, and may be kept alſo in ſome forme and proportion with cutting, and that the cuttings are much uſed as a ſtrawing herbe for houſes, being pretty and ſweete, is alſo much affected by diuers: but this alſo will often dye and grow out of forme, and beſides that, the ſtalkes will grow too great, hard and ſtubby, the rootes doe ſo farre ſhoote vnder ground, that vpon a little continuance thereof, will ſpread into many places within the knot, which if continually they be not plucked vp, they will ſpoile the whole knot it ſelfe; and therefore once in three or foure yeares at the moſt, it muſt be taken vp and new ſet, or elſe it will grow too royniſh and comberſome. Hyſſope hath alſo been uſed to be ſet about a knot, and being ſweete, will ſerue for ſtrewings, as Germander: But this, although the rootes doe not runne or creep like it, yet the ſtalkes doe quickly grow great aboue ground, and dye often after the firſt yeares ſetting, whereby the grace of the knot will be much loſt. Marierome, Sauorie, and Thyme, in the like manner being ſweete herbes, are uſed to border vp beds and knots, and will be kept for a little while, with cutting, into ſome conformity; but all and euery of them ſerue moſt commonly but for one yeares uſe, and will ſoone decay and periſh: and therefore none of theſe, no more than any of the former, doe I commend for a good bordering herbe for this purpoſe. Lauander Cotton alſo being finely flipped and ſet, is of many, and thoſe of the higheſt reſpect of late daies, accepted, both for the beauty and forme of the herbe, being of a whitish greene mealy colour, for his ſent ſmelling ſomewhat ſtong, and being euerliuing and abiding

greene all the Winter, will, by cutting, be kept in as euen proportion as any other herbe may be. This will likewise foone grow great and ftubbed, notwithstanding the cutting, and besides will now and then perish in some places, especially if you doe not strike or put off the snow, before the Sunne lying vpon it dissolue it: The rarity and nouelty of this herbe, being for the most part but in the Gardens of great persons, doth cause it to be of the greater regard, it must therefore be renewed wholly euery second or third yeare at the most, because of the great growing thereof. Slips of Iuniper or Yew are also receiued of some & planted, because they are alwayes green, and that the Iuniper especially hath not that ill sent that Boxe hath, which I will presently commend vnto you, yet both Iuniper and Yew will soon grow too great and ftubbed, and force you to take vp your knot sooner, than if it were planted with Boxe. Which lastly, I chiefly and aboue all other herbes commend vnto you, and being a small, lowe, or dwarfe kinde, is called French or Dutch Boxe, and serueth very well to fet out any knot, or border out any beds: for besides that it is euer greene, it being reasonable thicke set, will easily be cut and formed into any fashion one will, according to the nature thereof, which is to grow very slowly, and will not in a long time rise to be of any height, but shooting forth many small branches from the roote, will grow very thicke, and yet not require so great tending, nor so much perishing as any of the former, and is onely receiued into the Gardens of those that are curious. This (as I before said) I commend and hold to bee the best and surest herbe to abide faire and greene in all the bitter stormes of the sharpest Winter, and all the great heates and droughts of Summer, and doth recompence the want of a good sweet sent with his fresh verdure, euen proportion, and long lasting continuance. Yet these inconueniences it hath, that besides the vnpleasing sent which many mislike, and yet is but small, the rootes of this Boxe do so much spread themselves into the ground of the knot, and doe draw from thence so much nourishment, that it robbeth all the herbes that grow neare it of their sap and substance, thereby making all the earth about it barren, or at least lesse fertile. Wherefore



JOHN PARKINSON

to fhew you the remedy of this inconuenience of fpreading, without either taking vp the Boxe of the border or the herbes and flowers in the knot, is I thinke a fecret knowne but vnto a few, which is this: You fhall take a broad pointed Iron like vnto a Slife or Cheffill, which thruft downe right into the ground a good depth all along the infide of the border of Boxe fomewhat clofe thereunto, you may thereby cut away the fpreading rootes thereof, which draw fo much moifture from the other herbes on the infide, and by this meanes both preferue your herbes and flowers in the knot, and your Boxe alfo, for that the Boxe will be nourifhed fufficiently from the reft of the rootes it fhooteth on all the other fides. And thus much for the liuing herbes, that ferue to fet or border vp any knot, Now for the dead materials, they are alfo, as I faid beore diuers: as firft, Leade, which fome that are curious doe border their knots withall, caufing it to be cut of the breadth of foure fingers, bowing the lower edge a little outward, that it may lye vnder the vpper cruft of the ground, and that it may ftand the fafter, and making the vpper edge either plaine, or cut out like vnto the battlements of a Church: this fafhion hath delighted fome, who haue accounted it ftately (at the leaft coftly) and fit for their degree, and the rather, becaufe it will be bowed and bended into any round fquare, angular, or other proportion as one lifteth, and is not much to be mifliked, in that the Leade both not eafily breake or fpoyle without much injury, and keepeth vp a knot for a very long time in his due proportion: but in my opinion, the Leade is ouer-hot for Summer, and ouer-cold for Winter. Others doe take Oaken inch boords, and fawing them foure or fiue inches broad, do hold vp their knot therewith: but in that there boordes cannot bee drawne compaffe into any fmall fcantling, they muft ferue rather for long outright beds, of fuch knots as haue no rounds, halfe rounds, or compaffings in them. Ane besides, thefe boordes are not long lafting, becaufe they ftand continually in the weather, efpecially the ends where they are faftened together will fooneft sot and perifh, and for the whole forme will be fpoyled. To preuent that fault, fome others haue chofen the fhanke bones of Sheep, which after they haue beene

well cleafed and boyled, to take out the fat from them, are tfucked into the ground the fmall end downewards, and the knockle head vpwards, and thus being fet fide to fide, or end to end clofe together, they fet out the whole knot therewith, which heads of bones although they looke not white the firft yeare, yet after they haue abiden from frofts and heates will become white, and prettily grace out the ground: but this inconuenience is incident to them, that the Winter frofts will raife them out of the ground oftentimes, and if by chance the knockle head of any doe breake, or be ftrucke off with any ones foot, &c. going by, from your ftore, that lyeth by you of the fame fort, fet another in the place, hauing firft taken away the broken peece: although thefe will laft long in forme and order, yet becaufe they are but bones many miflike them, and indeed I know but few that vfe them. Tyles are alfo vfed by fome, which by reafon they may bee brought compaffe into any fafhion many are pleafed with them, who doe not take the whole Tyle at length, but halfe Tyles, and other broken peeces fet fomewhat deepe into the ground, that they may ftand faft, and thefe take vp but little roome, and keepe vp the edge of the beds and knots in a pretty comely manner, but they are often out of frame, in that many of them are broken and fpoiled, both with mens feete paffing by, the weather and weight of the earth heating them downe and breaking them, but efpecially the frofts in Winter doe fo cracke off their edges, both at the toppes and fides that ftand clofe one vnto another, that they muft be continually tended and repaired with frefh and found ones put in the place of them that are broken or decayed. And laftly (for it is the lateft inuention) found whitifh or bluifh pebble ftones, of fome reafonable proportion and bigneffe, neither too great nor too little, haue beene vfed by fome to be fet, or rather in a manner but laide vpon the ground to fafhion out the traile or knot, or all along by the large grauelly walke fides to fet out the walke, and maketh a pretty handfome fhew, and becaufe the ftones will not decay with the iniuries of any time or weather, and will be placed in their places againe, if any fhould be thruft out by any accident, as alfo that their fight is fo confpicuous vpon the ground, efpecially if they be not hid with

the store of herbes growing in the knot; is accounted both for durability, beauty of the sight, handsomeneffe in the worke, and ease in the working and charge, to be of all other dead materials the chieftest. And thus, Gentlemen, I haue fhewed you all the varieties that I know are vsed by any in our Countrey, that are worth the reciting (but as for the fashion of lawe-bones, vsed by some in the Low Countries, and other places beyond the Seas, being too grosse and base, I make no mention of them) among which euery one may take what pleaseth him best, or may most fitly be had, or may best agree with the ground or knot. Moreouer, all these herbes that serue for borderings, doe serue as well to be set vpon the ground of a leuell knot; that is, where the allies and foot-pathes are of the same leuell with the knot, as they may serue also for the raised knot, that is, where the beds of the knot are raised higher than the allies; but both Leade, Boordes, Bones, and Tyles, are only for the raised ground, be it knot or beds. The pebble stones againe are onely for the leuelled ground, because they are so shallow, that as I said before, they rather lye vpon the earth than are thrust any way into it. All this that I haue here set downe, you must vnderstand is proper for the knots alone of a Garden. But for to border the whole square or knot about, to serue as a hedge thereunto, euery one taketh what liketh him best, as either Priuet alone, or sweete Bryer, and white Throne enterlaced together, and Roses of one, or two, or more sorts placed here and there among them. Some also take Lauander, Rosemary, Sage, Southernwood, Lauander Cotton, or some such other thing. Some againe plant Cornell Trees, and plant them, or keepe them lowe, to forme them into an hedge. And some againe take a lowe prickly shrubbe, that abideth alwayes greene, described in the end of this Booke, called in Latine *Pycacantha*, which in time will make an euer greene hedge or border, and when it beareth fruit, which are red berries like unto Hawthorne berries, make a glorious shew among the greene leaues in the Winter time, when no other shrubbes haue fruit or leaues.

The Care of Woods and Ravines

By O. C. Simonds



DOUBTLESS nearly everyone remembers the pleasure of a day spent in the woods. The first wild flowers, the new leaves, the element of mystery, the chances to make new discoveries and the perfect freedom, give more pleasure than is usually received from a visit to the most cultivated and well-cared-for park. The household that can retain a bit of natural forest or even a ravine near at hand is indeed fortunate. The question may be asked, "What can be done to preserve the natural charm of such a feature?" To answer this question let us consider a few facts. The woods that charm us most have usually had nothing done to them. We discover in them trilliums, hepaticas, bloodroots and other wild flowers with an exclamation of delight. We enjoy the perfume of the wild crab apples, the lindens and of the woods themselves.

A gentleman in New York State developed a home on land containing many acres of woods. His gardener, wishing to use some leaf mold, raked the leaves, including the humus underneath, from quite an area in the woods. Although this was done more than ten years ago this land still lacks the wild flowers and charm of the areas left untouched. Even the trees have had less vigor on the land denuded of the protecting covering. Gradually the fallen leaves will produce another bed of leaf mold, but it will take a long time.

On a wooded hillside near a prominent city of Iowa the owner removed the under-growth and leaves in his desire to "clean up" and improve on Nature. Soon the land began to wash

away into the bottom of the ravine, leaving only bare earth where Nature had provided a covering of foliage and spring flowers. From these examples and many others which might be mentioned, rules for guidance may be formulated as follows.

1. Do too little rather than too much.
2. Disturb the natural surface of the ground as little as possible. If paths must be made, or steps provided, let them be unobtrusive.



RAVINE INJURED BY RAKING LEAVES AND EXPOSING
SUBSOIL TO WEATHERING

3. Broken limbs or dead trees and anything that looks like litter can be removed. Nothing looks worse than papers, empty cans, boxes and ashes which have been scattered by mankind. Do not burn this litter in the woods. Remove such rubbish to some open space; burn a little at a time and be sure that the fire does not spread.

4. Glimpses into the woods and vistas may often be improved by cutting certain shrubs and trees. When this is done, cut

close to the ground so as to leave no visible stump. Sometimes a pleasing opening can be made by removing certain branches. These should be cut close to the trunk or larger branch from which they spring.

5. Add to the interest of the woods by introducing additional wild flowers. In a perfect piece of woods no bare ground will be seen. Rocks may protrude in places but the ground itself will always be covered with leaves, wild flowers, ferns, mosses of other growth. These give attractive coloring at any season of



THE OTHER SIDE OF THE SAME RAVINE, PROPERLY CARED FOR. NOTE CARPET OF LEAVES

the year. Brown leaves are not objectionable in appearance. I think it was Hammerton who said that no object furnished a better example for a student to draw than an oak leaf. The outlines of leaves are always pleasing. At times leaves must be raked from open lawns, from drives or from walks, but do not rake them from the woods.

6. It is especially important that the sides of ravines be kept well clothed with vegetation to prevent washing. Sometimes

the leaves will accumulate in ravines to such a depth that plants underneath will be destroyed. In such cases the surplus leaves can be removed and put into a compost pile.

7. Do not pave or cement the bottom of ravines, because this treatment would destroy the charm of wildness. The sides of the channel can usually be protected by boulders or moss-covered logs. Occasionally where there is a waterfall it may be necessary to use cement at the bottom of the channel to prevent the earth from being gouged out, but such an apron should be concealed by placing upon it boulders, cobblestones and gravel.

8. Do not permit your gardener to dictate regarding the treatment of woods or ravines. He is usually anxious to find something to do and wishes to have his work show. The woods and ravines should look as though nothing had been done to them. Here the statement that "it is the perfection of art to conceal art" is eminently true.

Two Injurious Leaf Maggots

By E. P. Felt



THE ornamental box and the chrysanthemum are both attacked and somewhat, if not seriously, injured by recently introduced insects.

The enemy of the box is a fragile, yellowish, long-legged gall midge about $\frac{1}{12}$ of an inch long. It is a well known European insect and appears in this country the latter part of May and deposits eggs in small slits cut in the younger leaves. The presence of the pest is indicated by more or less irregular, oval swellings on the leaves, each marking an excentric, oval clear space, mined beneath by one or more pale yellowish white maggots about $\frac{1}{16}$ of an inch long. There is frequently an irregular yellowish or brownish discoloration and a slight elevation of the leaf. This is most easily seen in September and later after the maggots are more than half grown. An infested leaf may contain only one or two miners and show comparatively little injury or there may be six or more of the pests with an accompanying destruction of most of the leaf. This gall midge weakens the plant, causes badly infested leaves to drop in the spring and leaves unsightly bare stems with new leaves developing at the tip.

Two or three sprayings of a contact insecticide such as kerosene emulsion or whale oil soap solution applied when the midges are beginning to issue and distributed during the period of flight, appeared to be very effective in controlling the pest at Newport, R. I. Later experiments in Maryland showed that large numbers of midges were entrapped and destroyed by spraying the box with four pounds of molasses to fifty gallons of water. This treatment should be given at the beginning of the appearance of the midges, which in that latitude would be from May 10 to 15 and might, in the case of a serious infesta-

tion, be advantageously repeated about a week later, specially if rain intervened.

The chrysanthemum midge is a later introduction than the preceding. It is a small, reddish fly about $\frac{1}{15}$ of an inch long. A serious infestation of young plants three to five inches high may cause greatly enlarged, irregularly swollen stems (these sometimes being twice their normal diameter), deformed rudiments of leaves, due to an arrested development and a failure to produce blossoms. The small, pale greenish or yellowish maggots occur in irregular, ovoid swellings, each with a length about $\frac{1}{12}$ of an inch and frequently projecting at a rather marked oblique angle above the normal surface of the affected tissues. One of the easiest methods of detecting the small gall is to allow the leaf to slip through the loosely closed fingers, a process which readily discloses the presence of slight swellings. This pest, unlike the box midge, breeds continuously when conditions are favorable and is particularly likely to be numerous in the fall and spring.

This chrysanthemum pest is easily distributed with infested plants and consequently every reasonable precaution should be adopted to prevent its introduction into uninfested greenhouses. Badly infested plants should be burned (they are practically worthless). Recent work in Ohio has shown that spraying with forty per cent nicotine sulphate diluted with five hundred parts of water, to which fish oil soap in the usual strength has been added, resulted in killing practically all adults from sprayed galls almost immediately after emergence, provided the spray was not applied more than three or four days earlier. In other words, repeated sprayings with a nicotine soap preparation at three to four day intervals is the most promising method of controlling this serious enemy of chrysanthemums.

Landscape Models for Suburban Properties and Country Estates

*By Albert D. Taylor**

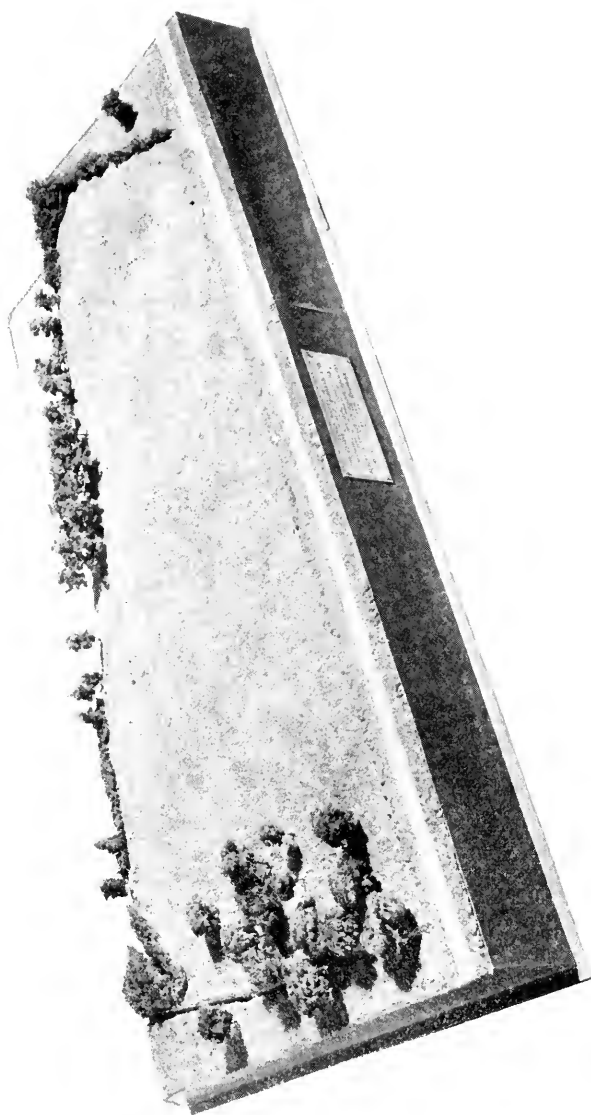
Non-resident Professor of Landscape Architecture, Ohio State University



THE value of small models for use in the development of the landscape features of the suburban lot and of the country estate has been but little appreciated until very recently. The value of landscape models for the development of such properties can readily be appreciated through a careful study of the photographs and plates accompanying this article,

The owner of property, contemplating the erection of a new home, or the improvement of the grounds surrounding an existing home, is at once confronted with the problem of picturing in his imagination the complete development from its various points of view. He is provided with interesting and attractive drawings. These drawings at best, impress the layman as being complicated. He can appreciate possibly but little of the real architectural details and much less of the difficult problems involved in grading. Through a comparison of the photographs of the models, the difficulty of solving these grading problems entirely through the imagination, may be at once appreciated. The difficulty of solving these problems with nothing but plans of existing and proposed conditions, is much more apparent. In general, unless the design is a very simple one, the average person is entirely unable to imagine in a pictorial way, the finished work.

* With photographs and models by the author.

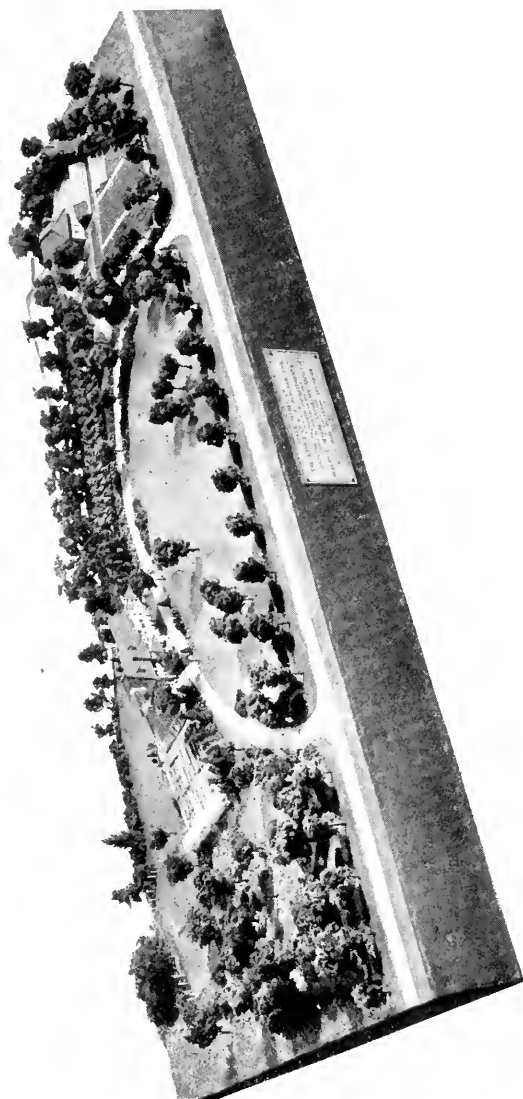


LANDSCAPE MODEL SHOWING
EXISTING SURFACE
H. P. BURGARD, ESQ., BUFFALO

Perspective drawings are frequently made and aid the imagination greatly in solving these problems. They are expensive to develop and in but few cases are sufficient perspective drawings made to enable the owner to study the property from more than one or two points of view. Then the owner is left entirely in the dark concerning an innumerable number of details to be studied from the many other different points of view. Many times in the development of such properties, the question of tree location and massing of shrubbery must be settled definitely long before the buildings are completed. These problems are much more easily solved if studied in the model form. Perspective drawings are frequently forced, or "faked" very often to overcome the weak points shown in unnatural settings and impossible surroundings, together with unnatural lights and shadows, in order to produce a pleasing effect in the client's mind. The relationship of plantings to the scale of the architecture, the relationship of open areas, one to the other, and the relationship of vistas and screen plantings to desirable and undesirable views, are readily appreciated in the development of models. They are not appreciated in the development of perspective drawings.

Models are of invaluable assistance in connection with the development of plans in the office. They are of equally as much value to the office as to the owner or developer of property. The survey of a property, which is the basis of all landscape studies, is much more valuable if accompanied by a model, illustrating the existing conditions. The designer and the client are both able to study the property from all points of view. If in the development of the model, the effect produced is not pleasing or desirable, changes in the model can be made and many costly mistakes avoided in the execution of the work.

There are two types of models which may be used in the landscape development of properties. The first type of model is the one to be used for observing purposes and not to be handled. The representation of various features on the property such as buildings and plantings, may be made in a less stable manner so long as the desired effect is produced.



DETAILED STUDY OF
PROPOSED PLANTING
H. P. BURGARD, ESQ.

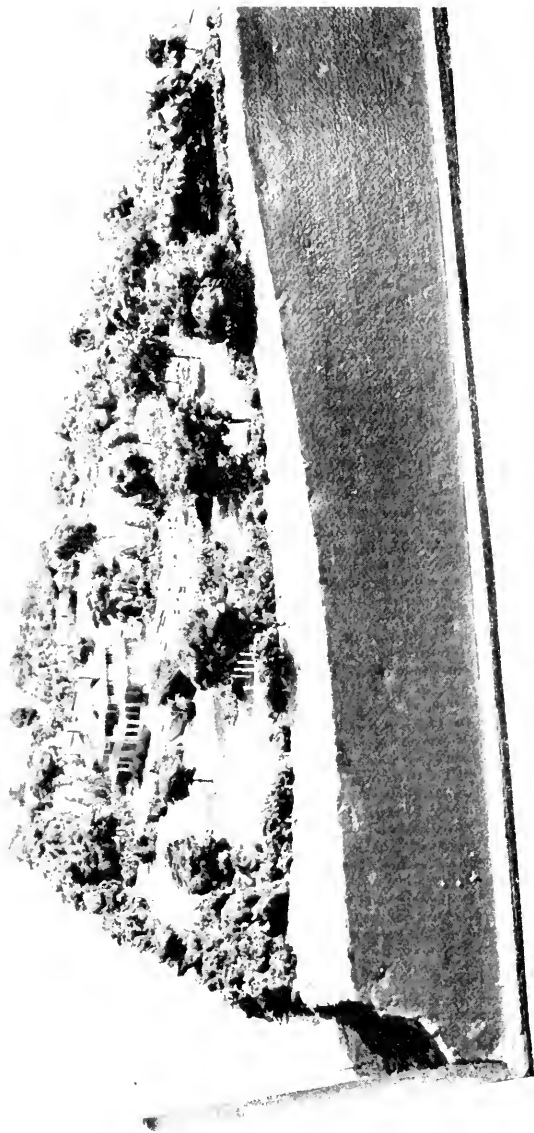
The second type of model is the model which is to be subjected to handling. This must be made in a much more stable manner. The buildings must be more firmly glued, the trees must be firmly imbedded in the form of the model, and in many cases reinforced with additional wiring.

The making of models as shown in the accompanying photographs is a fascinating occupation. The requirements are few, and consist principally of patience and the ability to do accurate work with a few simple tools.

The objects to be modeled, as shown by the accompanying photographs, are divided into two classes, buildings and landscape. The former is naturally the simpler problem and depends on the scale of the model and the limitations of patience and time given to the work and admits of showing as much of the detail as is desired. The latter, however, depends more upon suggestions conveyed through plans and much greater ingenuity is required. While many of the smallest details of buildings can be shown, it is impossible to model the branches or leaves of trees or the ripples on water. A few suggestions covering the methods of making such models may be of value.

In the modeling of buildings, cardboard is the most practical material. Each wall and roof plane is drawn with a T-square on cardboard. The windows are shown the same as in any elevation, and later traced on a piece of transparent celluloid. White or colored ink is used to represent sash. The window is then cut out of the cardboard, thus forming a reveal. The celluloid on which the window has been traced is placed back of the opening and glued to the cardboard. Brick, shingles, waterboards, and casings may be marked on the cardboard with a ruling pen or pencil. They may also be indented with a dull knife. The different pieces of cardboard showing the different elevations of buildings are then cut out and assembled by applying suitable paste to the edges.

The roof tile is represented by the use of corrugated paper. Cylindrical columns can be made by use of pencils, brush handles, or matches, painted with Chinese white or other colors.



NEARER VIEW OF MODEL.
SHOWING EFFECT OF CONTOURS
H. P. BURGARD, F.SQ.

Cornices are constructed by the use of cardboard of various widths and thicknesses with rounded edges, produced by rubbing with sand paper. Representations of rafter ends are cut out of cardboard and pasted under the eaves. If the scale is sufficiently large to show any ornament in the caps of the columns, these may be modeled in clay or cast in plaster, small duplicates being cast in plaster and glued on the model. The only limitations in the execution of architectural detail is the amount of time and money one is willing to expend. Very often it is not necessary to show the smaller details which with a little careful handling may be omitted in a manner similar to that in which the painter avoids detail on canvas through suggestion.

The work in developing the landscape features of a model is much more complicated. There are many different methods and materials which may be used. These should be selected with special reference to each individual problem.

The contour of the ground may be modeled in a plasteline or patent clay, which admits of unlimited alteration. The objection to it, however, is that the surface never thoroughly hardens and, therefore, does not form a solid base on which to attach trees and buildings. If plaster is the material decided upon, the plaster cast can be readily made of the model for permanent use. The plaster cast offers a hard unchanging material, the only objection to which is that it is easily broken and is unnecessarily heavy, the added weight often making large models too heavy to be easily handled. The most satisfactory material probably is cardboard. This material has many advantages over other materials in that it is light, making the model easily handled and withstands a considerable amount of jarring and offers an ideal substance in which to drive nails or pins, or on which to glue architectural features or to attach trees.

Water such as lakes or ponds, is best represented by a sheet of thin plain glass under which may be placed a surface tinted with a light grayish blue, inked or painted. These water areas should be first developed in order not to interfere with the rest of the work later.



MODEL SHOWING PROPOSED
LANDSCAPE ARRANGEMENT
H. P. BURGARD, ESQ.

Models are usually made with a study similar to that shown in one of the illustrations in hand. This information together with architects elevations, photographs of the buildings if any exist, and a study of proposed or existing conditions are used for reference. Ground work, showing the difference of elevations is modeled in clay and plasterine. The plat is drawn on a board which is used for a base of the model. Points are located at convenient intervals and nails driven into the board at these points. Each nail is driven down until the height is at the proper elevation above the board to indicate the definite grade at that point on the model. Clay is then applied and smoothed down even with the tops of the nails.

Another and more accurate method of modeling contours of the grounds is to run small slabs of plaster representing typical sections, through the property. These to be cut to conform to the contour lines on the plat and then placed side by side and glued together with shellac. In all such models, the permanent model is generally produced as a plaster cast.

Sheets of cardboard or beaverboard may be used instead of plaster slabs. The clay, which covers the surface of the model in a thin layer, is then shellacked and painted.

After the general base of the model has thus been developed, the buildings, fences, shrubbery and garden areas are added. The features such as trees and large shrubs are often omitted until the model is colored, because if inserted in the earlier stages, they would interfere with the ease of the work over the remaining details on smaller features and the painting of the model. Wire fences and tennis court backnets are represented by pins with their heads clipped off at the proper height. Shrubs and bushes are represented by pieces of sponge painted green, and attached with pins or shellac. Small shrubs as well as small trees, vegetable and flower gardens are best represented by being modeled in a pulp made of soaked tissue paper, water, and plaster paris, which is added to the surface of the model.

Trees are best represented by sponges reinforced with wire to represent branches and trunks. Two or three strands of small wire are twisted together at the bottom to form the trunk



PHOTOGRAPH OF PARTIALLY
COMPLETE DEVELOPMENT
H. P. BURGARD, ESQ.

and they are spread at the top to form the branches. Pieces of sponge cut to the proper shape to represent the tops of trees are then slipped over the ends of the wire and the ends of the wire turned back, hold the sponge in place. It is often much better to conform the sponges to the shape of the trees after they have been attached to the wire. It may be interesting to note that coarse pieces of sponge cut in jagged horizontal layers well separated from each other, are used as excellent representation of oaks; elms are made of flat pieces of sponge cut in an umbrella form; evergreens are represented by pieces of sponge cut in conical shape.

Coloring of landscape models is one of the most difficult features and often requires great artistic skill and knowledge of color combinations in order to produce the best results. Contrary to the liberal interpretation of color schemes, the result is sure to be disappointing if colors are used to match the colors of nature for the reason that the same color has an entirely different effect out in the open sunlight as compared with the effect produced indoors under artificial lights where models are so often seen. A color appears much stronger when covered over a large surface than when it covers only a small spot. Atmosphere and the variation of color caused by its varying intensities, are entirely lacking of its effects indoors. It is, therefore, desirable to use pigments lighter than those seen in nature, in order to neutralize and make up for the lacking of "atmosphere" and to brighten colors in many other cases because of the small area. A considerable variation of color on objects of seemingly the same color is adopted in order to make up for the lack of reflection and the accumulation of dirt and weather stains, producing the effect of age.

It is highly desirable that the models should be observed in a strong concentrated light which comes as much as possible from one direction.

The photographs accompanying this article illustrate to a greater or less degree, the value of models in the development of large suburban estates.

Cleveland



DETAILED STUDY OF
INTERIOR OF FLOWER GARDEN
H. P. BURGARD, ESQ.

Plant Immigrants

The office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry publishes a list, under the above name, of recently imported plants, many of which are valuable to the gardener, from a decorative or economic standpoint. Through the courtesy of Mr. David Fairchild, who is in charge of this work, we are enabled to reprint notes on such plants as have particular interest to our readers. To all who can demonstrate their fitness to care for these recent introductions, the office of Foreign Seed and Plant Introduction will send what is available. Recipients of such material, which often requires considerable skill in handling, obligate themselves to report, when requested, as to what the result of their observations has been. It is essential that the numbers assigned by the Office should be firmly attached to the plant. By this the government gets data on hardiness of the new introductions, and the growers have an opportunity for the observation, first hand, of plants that may prove important. Applications for or letters about these plants should not be sent to the Editor but to Mr. David Fairchild, Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, Washington, D. C.



MARANTHUS PANICULATUS L. 44469, *Amaranth* seeds from San Juan Batista, Tabasco, Mexico. Purchased from Mr. Cabriel Itié, Director, Agricultural Experiment Station. "Alegria is produced in Tlajomulco, Zacoalco and San Pedro Tlaquepaque, districts belonging to the state of Jalisco. This annual is sown in nurseries; in the month of December it is harvested and is used in the making of sweets. I was told that the seeds in question are found with difficulty in the pueblos near Guadalajara, for the inhabitants do not put them to any practical application and if they are sometimes used, it is when they are mixed with dulce for children; they are surely very insipid. They are also seen in the state of Michoacán, where they are used for the same purpose."

AMPELOPSIS ACONITIFOLIA Bunge. 44549. Seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A very handsome vine from northern China, with finely divided foliage. The leaves are 5-parted and 2 to 3 inches long; the inconspicuous flowers appear in summer; and the small orange berries mature in autumn. It should be planted

where only a light covering is desired, and is hardy in the northern United States.

CASTANOPSIS SCLEROPHYLLA (Lindl.) Schottky. (Fabaceae.) 44663. Seeds from Nanking. An evergreen tree, 25 to 65 feet tall, growing in woods of Hupeh and Chekiang, China, at elevations up to 1500 m. (5000 feet). It is a handsome tree with nearly smooth, dark gray bark, and a densely-branched flattened crown. The natives gather the small chestnut-like nuts and crush them, making an edible paste resembling bean-curd in appearance and the chinkapin in flavor.

CATALPA BUNGEI C. A. Meyer. (Bignoniaceae.) 44664. Seeds from Nanking, China. Presented by Prof. Joseph Bailie, University of Nanking. A quickly-growing Chinese tree, up to 100 feet in height and with a trunk 10 to 15 feet in diameter a few feet above the ground. The wood, which is strong, light, durable and non-warping, resembles walnut to a large extent and is much in demand for fine furniture. The tree might be cultivated in the semiarid sections of the United States where the winters are not too severe. It prefers a porous soil, and is easily propagated from suckers which spring up from the roots that are near the surface of the ground. Not the dense round bush ordinarily grown as *C. bungei* Hort.

CLERODENDRUM TRICHOTOMUM FARGESII (Dode) Rehder. (Verbenaceae.) 44533. Seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A Chinese shrub, 3.5 to 4 meters (10 to 15 feet) in height; with dark green, oval, lance-shaped leaves, 10 to 15 cm. (4 to 6 inches) long; very fragrant, light pink flowers in axillary cymes; and dark purple drupes, 4 to 5 mm. ($\frac{1}{5}$ inch) in diameter, with very hard, black seeds. It is easily raised from seed, in ordinary soil.

DOCYNIA DELAVAYI (Franch.) Schneider. 44677. Seeds from Yunnanfu, Yunnan, China. Purchased from Mr. Frank Pilson. An ornamental evergreen, spiny tree, up to 30 feet in height; with glossy, ovatelanceolate leaves, 2 to 4 inches long; and umbels of white flowers which appear in the spring. The fruit is an ovoid pome about an inch long. The tree is a native

of southwestern China, and has recently been introduced into the United States. The fruits are more or less acid and are used for cooking. They could possibly be improved by selection and hybridization. The tree is propagated by seeds, and might possibly be grafted on apple stock.

ELEOCHARIS TUBEROSA (Roxb.) Schultes. 44573. Tubers from Yokohama, Japan. Purchased from the Yokohama Nursery Company. They are mostly eaten raw, but are also sliced and shredded in soups, and in meat and fish dishes. Foreigners in China grate them and serve them as a winter vegetable, in which state they resemble sweet corn very much in looks and taste. The plants need a hot summer to mature and are grown on a muck or clayey soil with several inches of standing water on top, very much in the same manner as wet land rice. (Adapted from Notes by F. N. Meyer.) According to Mrs. Yamei Kin this water chestnut is planted in hills 3 ft. apart in soil enriched by hog manure and after the plants have started well then they are flooded and kept flooded until the frost cuts back the foliage then the water is drained off and the hills are dug with a broad bladed hoe and the tubers taken out of each hoe full of mud.

LIQUIDAMBAR FORMOSANA Hance. 44666. Seeds from Nanking, China. Presented by Prof. Joseph Bailie, University of Nanking. A handsome tree, 20 to 40 m. (65 to 130 feet) in height, with a straight trunk, a much-branched head, and frequently buttressed roots. The leaves turn to a chestnut-brown or red in the autumn, and are retained late into the winter. In juvenile plants the trees are 5-lobed, while in the adult trees the leaves are only 3-lobed and are smaller. In Kiangsi the wood is used for making tea-chests. This is one of the most widely distributed trees in China, being particularly abundant in western Hupeh; and it is cultivated in Japan.

LONICERA STANDISHII Carrière. (Caprifoliaceae.) 44537. Honeysuckle seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A charming, early-flowering shrub, with pale yellowish brown branches; pale green, nearly oval, deciduous leaves, 3 to 5 inches long; and white, sweet scented flowers, $\frac{1}{3}$ to $\frac{1}{2}$ inch long.

PRUNUS CONRADINAE Koehne. 44538. Cherry seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A graceful tree from central China, reaching a height of 25 feet, with oval or oblong, doubly serrate leaves, 2 to 6 inches long; whitish or pink flowers, about $\frac{3}{4}$ inch long, in 2 to 4-flowered umbels; and red, ovoid fruits, $\frac{1}{3}$ to $\frac{1}{2}$ inch long.

PRUNUS TOMENTOSA Thunberg. (Amygdalaceae.) 44539. Cherry seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A broad, vigorous shrub from northern China, one of the earliest cherries to flower. The flowers are large, with the white petals more or less tinged with red toward the base; and the small, bright red, slightly hairy suits are of good flavor. It is now being cultivated in the northwestern parts of the United States, and in southwestern Canada, where other cherries are not hardy.

PYRUS SP. 44674-44675. Pear cuttings from Ningto, China, Obtained by Rev. L. C. Hylbert, American Baptist Mission, through Rev. G. W. Sheppard, English Methodist Mission. These cuttings were sent in response to a request for propagating material of certain pear trees growing on the Island of Chusan which produce immense fruit. Mr. Hylbert reports that "the cuttings were secured from a gentleman's garden, and are said to be beyond price."

ROSA BANKSIAE NORMALIS Regel. 44544. Rose seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. "This Rose is very abundant in western Hupeh and eastern Szechwan from river-level to 1000 m. altitude and is fairly common in western Szechwan in the valleys of the Tung and Min rivers and neighboring regions up to 1500 m. altitude. It delights in glens, ravines, and rocky places generally, where it forms tangled masses 6 m. and more high, and as much in diameter; commonly it rambles over trees, and Wilson has seen trees 15 m. and more tall, completely festooned with this Rose. The flowers are always pure white, and we have never observed any tendency towards double flowers in the wild plant; nor did Wilson see it or any of its forms cultivated in

gardens in central or western China. The umbellate inflorescence well distinguishes this species from its nearest relation *Rosa microcarpa* Lindley. The root-bark is used locally for strengthening fish nets and dyeing them brown."

ROSA MOYESII Hemsley & Wilson. 44545. Rose seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. Forma *rosea* Rehder & Wilson. An upright bush, found in western Szechwan, China, up to 3300 m. (11,000 feet) elevation, growing to a height of 1 to 5 m. (3 to 16 feet), and distinguished from the typical species by its large leaves and large pale pink flowers. The large fruits are either dull red or scarlet.

ROSA RUBUS Leveille & Vant. 44546. Rose seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A climbing shrub, common everywhere in western Hupeh and eastern Szechwan, China, from river-level to an elevation of 1300 m. (4,200 feet.) It is readily distinguished from its near relatives by the densely hairy shoots and leaves, and grows to a height of 2.5 to 4 m. (8 to 13 feet), with dull red, globose fruits. (Adapted from C. S. Sargent, *Plantae Wilsonianae*, vol. 2, part 2, pp. 308, 309.)

STYRAX WILSONII Rehder. (Styracaceae.) 44595. Plants from Orleans, France. Purchased from Messrs. Leon Chenault & Son. A very ornamental, deciduous shrub, 6 to 10 feet high; native of western China. Twiggy and much-branched, with ovate, green leaves, $\frac{1}{2}$ to 1 inch long, usually entire but sometimes with the ends 3-lobed or sparsely toothed. The solitary, nodding flowers are pure glistening white, $\frac{5}{8}$ to $\frac{3}{4}$ inch wide, and are produced in June on short stalks from the leaf-axils. The shrub is remarkable in that it begins to flower when only a few inches high and two or three years old. It is probably hardy as far north as Philadelphia.

VIBURNUM KANSUENSE Batalin. 44547. Seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A tall Chinese shrub, of loose and open habit, found at elevations of 6000 to 9000 feet. It has oblong leaves, and juicy, red berries which are used in making agreeable drinks.

Book Reviews

School and Home Gardening. By DR. KARY C. DAVIS. (Published by J. B. Lippincott Company; illustrated; 339 pages, price \$1.50 net.)

This book, while covering the entire field of gardening, at the same time offers real help for the schools by way of concrete work. The book is suggestive, and constructive in its method of compilation. Teachers of both country and city schools could use it as well as club leaders and community garden workers, or it might be put directly into the hands of the children themselves.—ELLEN EDDY SHAW.

Our Trees. How To Know Them. BY ARTHUR I. EMERSON AND CLARENCE M. WEED. (8vo. pp. 286 + XVI with Index. J. B. Lippincott Company, Philadelphia and London, \$3.50.)

As the title suggests, this is designed for those who desire a knowledge of our common trees and a few of the ornamental imported ones without having to delve too much into the science of botany to identify them. It relies mostly on its photographs to present to the reader the characteristics of the tree by which it may be most readily identified. The descriptions written on the pages opposite the illustrations are clear and concise and do not go too far into the technical to tire the average observer. The photography is well done and while in some cases the identifying characteristic is reproduced somewhat dwarfed still the whole group of bark, leaves and flowers presents a very satisfactory means of identification. The size, 8 x 10 inches, prevents it from being a handy book for field use and it finds its greatest value on the study table. A very good description and plate is given of the Poison Sumac. Too little is known of this dangerous plant by the casual wood traveller.—SERENO STETSON.

The Principles and Practices of Pruning. By M. G. KAINS. (Pp. 420. Orange Judd and Company. New York, \$2.00.)

There have been published numerous books on the art of Pruning and one can study a lifetime and still not absorb all the various methods pertaining to the care of trees and shrubs.

Many publications on pruning are too obscure, and an amateur is more often led astray than guided by the simple knowledge which it ought to contain. Mr. Kain's book on "The Principles and Practice of Pruning" is an

exception to this. He has put his practical knowledge into book form as simply as possible.

Some sections are quite technical for beginners, especially chapter 2 on Plant Physiology and three on the Philosophy of Pruning.

The book is well illustrated, many fruits, ornamental trees and shrubs being figured, showing the right methods to be used, and also the results.

The student can thus get a great deal of knowledge from the book but of course the knowledge of the art of pruning is best gained by studying experts' methods at first hand. For those who cannot do this the book will be the next best thing.

There are various illustrations of good and bad instruments, which to use for pruning and which not. This is a great help to the average man, as there are too many pruning tools on the market which are of no practical use.

It certainly deserves a wide circulation—CHRISTIAN VAN DER VOET.

*Three Views of Rock Wall Planting
in Summer and Winter*



ROCK WALL IN SUMMER
MRS. CHARLES LUDDINGTON
ARDMORE, PENNSYLVANIA



ROCK WALL IN SUMMER (NEARER VIEW)
WHITE-FLOWERED PHLOX SUBULATA



ROCK WALL IN WINTER
SNOW MAKES IT BLOSSOM WITH WHITE
ST. MARTIN, PENNSYLVANIA

Notes and News

At a public hearing held in Washington on May 28, more than a hundred people attended to present arguments *pro* and *con* regarding the proposed restriction or prohibition of the importation of nursery stock into the United States. In issuing the call the Federal Horticultural Board sent to those interested the following proposals, which in their opinion are necessary and should be put in force:

A. That all foreign grown balled, tubbed, or potted plants, except as noted under B, be excluded in accordance with the following groups and dates:

Group 1.—Azaleas, Rhododendrons, Palms, Araucarias, Bay Trees, Hollies, Ericas, and Acacias, January 1, 1923.

Group 2.—Conifers, dwarf and other kinds, Buxus, etc., usually shipped as specimen plants, July 1, 1919.

Group 3.—Small potted plants, including Roses, Chrysanthemums, Violets, tender bedding plants, Ferns, tropical and sub-tropical plants, etc., January 1, 1919.

Group 4.—Clumps of hardy perennials used in forcing, Japanese Maples, Magnolias, etc., July 1, 1919.

B. That provision be made for the admission of limited numbers of new varieties or novelties out of pots not exceeding two inches in diameter, this work to be conducted through the Department under rules and regulations prescribed by the Federal Horticultural Board.

C. That no action be taken at this time toward the exclusion of *all* stock from the Orient, and other little explored parts of the world, but that steps be taken looking toward action in the near future of excluding certain groups of plants, especially from the Orient.*

These recommendations are presented for discussion, but, as indicated in the opening paragraph of this statement, are not to be taken as limiting the scope of discussion nor the ultimate action of the Department.

Representatives of practically all the leading nurserymen and florists were present and actively opposed this on the ground that in this country the propagation of many of these plants is very difficult or impossible, and that therefore, to quote one of them, "the ruling would set back American horticulture for fifty years." Most of us do not realize the tremendous size of the importations of nursery stock from Holland, Belgium, England

*If this had been in operation for the last few years it would have excluded from the general public the important collections of E. H. Wilson from Western China, Japan, etc.—Ed.

and France. In certain groups of ornamental shrubs and trees, in some stocks for fruit trees, roses, etc., practically our total supply comes from abroad. The shutting off of this supply would mean either drastic readjustments, or else the substitution of species propagated in this country.

Plant pathologists and entomologists at whose suggestion the hearing was held, pointed out that nearly all the most destructive pests which have worked such havoc have come in through nursery stock, and that the only way to guard against further depredations is to pass the above proposals or even more immediate or drastic ones.

The editor of this JOURNAL, appearing for the Club, urged the necessity of caution and suggested the elimination through quarantine at our ports, or abroad before shipment, of the infection, rather than the total prohibition of the plants that are assumed to be carriers of the infection or insect pest. Experts of the Board confessed that no effective system of quarantine had yet been discovered, and that the proposals under discussion were the only way that they could devise out of a difficult situation.

Importations of certain plants will be permitted through the Bureau of Plant Industry, but this is of departmental rather than commercial or general interest.

No action was taken at this hearing, but barring new evidence, it appears that the action of the Federal Horticultural Board will be along the line suggested above. If that is done, most of our Rhododendrons, Azaleas hollies, box and roses, will be available only as propagated in America. Most of the nurserymen agree that anything like an adequate supply will be out of the question for years, if the Board takes the action which in their opinion is necessary for the safety of American agriculture and horticulture.

Delphiniums

Delphiniums have been particularly beautiful this season, every country garden having a more or less striking display of this most attractive perennial, from the small cottage with its single plant, the pride of the owner, to the more ambitious display in the large well tended herbaceous border where things are supposed to be better cared for. Too often a very beautiful plant has its glory destroyed by the method of support afforded it. To tie a number of spikes to a single stake, or crowd them together in any way is treatment that should not be tolerated, as this does not enhance the beauty of the flower or its symmetry of growth.

The very best way to support Delphiniums is to make them appear natural, and the method here described will accomplish this with a mini-

num of expense and labor. When the plants have attained a sufficient height to require support, take a few pea brush of sufficient height to guarantee support during the flowering period and stick firmly between them. They require no tying, the foliage will cover them, and the natural free growth of the plant is preserved. Sow Delphiniums in September, winter in cold frames, plant out in the garden in rows, in spring, when in flower pull out the undesirable ones, label those left for color, etc, and plant in permanent quarters in fall or spring, where they will make large plants and a grand display. *Anemone Japonica* makes a good companion to plant with Delphiniums as their flowering season follows closely, but when treated in this way they must not be planted too thickly or the Anemones will be crowded out early in the season, as the Delphiniums start into growth very early.—ALFRED J. LOVELESS.

We learn with regret of the death, early in June, of Frank N. Meyer, one of the most successful agricultural explorers ever sent out by the Government. Thousands of valuable plants from China and Japan have been sent by him to the Bureau of Plant Industry and from there distributed as "Plant Immigrants," such as are noted in this and earlier numbers of the JOURNAL. Expecting only E. H. Wilson, probably no recent explorer has sent such rich collections from the East. Mr. Meyer was missed from a steamer on the Yangste, from which river his body was afterwards taken. There were no indications as to the cause of death.

Extension of the Limits of Cultivation of the Vine by Means of Various Hybrids. L. Daniel, and H. Teulie, in *Comptes rendus des Seances de l'Academie des Sciences*, for February 18, 1918

One of the writers, M. L. Daniel, had shown, in 1894*, that, in some cases, certain qualities could be communicated to a scion or to a subject with given defects, by grafting on improving subjects. Through this information, Jurie and Castel obtained noteworthy improvements in their sexual hybrids both as regards quality and resistance to phylloxera. After the death of these two hybridisers, the systematic improvement of sexual hybrids of the vine was undertaken by Baco†, who obtained in

*DANIEL, L., Creation of New Varieties by Grafting (*Comptes rendus*, Vol. 118, 1894, p. 992). (*Author's note*).

†BACO, Culture directe de greffage de la vigne (*Revue Bretonne de Botanique*, 192) (*Authors' note*).

this way sexual-asexual hybrids or graft hybrids showing considerable progress on the original hybrids. Amongst these hybrids, number 24-23, improved by grafting, was noticeable for its earliness, and the author began to grow it at Ille-et-Vilaine. After various trials and failures, the experiments made since 1914 appear successful and conclusive.

The Baco hybrids (mostly 24-23) of the authors' vineyard are planted under unfavourable conditions: the ground forms, between high buildings, a broad passage unfavorable to the concentration of heat; according to the season, the sun only reaches the plantation between 6 and 9 a.m., leaving it between 3 and 6 p.m. Nevertheless, of recent years, the grapes have been ripe at the earliest on September 26 and at the latest October 18. Still better results are hoped for when the same plants are planted on the hillside and exposed to the heat and light from sunrise to sunset.

The wine obtained is agreeable to drink, of medium quality and richly colored.

Formerly the vine was grown all over Brittany. Since the fourteenth century the limits of cultivation of the vine has continually receded and still recedes from north to south. With suitable plants, the former extent might be again attained, especially if cultivation were simplified, as with Baco 24-23, by the suppression of grafting, sulphuring and sulphating.

Analytical Characteristics of the Extreme Harveys, 1914 and 1917.

	1914	1917	Control vine 1914*
Degrees of alcohol.....	8°	8.8°	7°
Dry extract.....	33.9	27.20	24.7
Dry vacuum extract.....	44	32.04	30.6
Ash.....	5	4.32	2.6
Sugar.....	5	0.96	8.6
Total acidity, in sulphuric acid.....	6.9	6.27	7.6
Fixed acidity.....	6.4	5.80	6.9
Volatile acidity.....	0.5	0.47	0.7
Total tartaric acidity.....	4.5	4.97	2.7

*It seemed of interest to contrast the analysis of an ordinary wine, harvested in the department of Lot, at Bétaille, right bank of the Dordogne, and made from a mixture of Clinton, Canada, Othello in smallest part, and several other hybrids in very small amount. The 1914 analysis was made by M. PERRIER; that of 1917 by M. C. LAURENT (*Authors' note*).

From experiments cited and others in progress it seems possible that the vine might be cultivated over a larger area than the present one. Such an extension would obviously have considerable economic and social consequences.

Vinifera Grapes in the State of New York, U. S. A., N. D. Anthony, under the direction of U. P. Hedrick, in New York Agricultural Experiment Station, Bulletin No. 432, pp. 81-105. Geneva, N. Y., April, 1917

For two hundred years vain attempts have been made to grow the European grape, *Vitis vinifera*, in eastern America. The end of these attempts was hastened by the discovery of satisfactory native sorts such as Isabella and Catawba. In the meanwhile, very different results were being secured on the Pacific coast where, in southern and central California, the *Vinifera* grapes found congenial conditions.

It has been found that there were four chief reasons for the failures to grow grapes in the east: (1) the downy and powdery mildews, (2) black rot, (3) phylloxera, and (4) winter injury.

Experimental culture of the European grape was undertaken at Geneva Station in 1900 when cuttings or plants of 19 varieties were received. In 1911, cuttings of more than 70 varieties were grafted upon a collection of Station seedlings ranging from 6 to 10 years old. Satisfactory results were obtained.

As a result of the work at Geneva certain recommendations can be made for New York State. One of the chief difficulties is to obtain plants of the desired kinds. Such as can be obtained are not always on resistant roots. For this reason the grower should know how to graft cuttings on phylloxera resistant roots such as *Vitis vinifera*, which can be done either in the nursery or in the vineyard.

In planting *Viniferas* less space is required than with the native sorts; rows 6 ft. apart and plants 6 ft. in the row give satisfactory results. In the east the vines should be supported with the regular 2-wire trellis. Because of the necessity of bending the trunk to the ground for winter protection, a replacing spur should be left at the base of the trunk to use in forming a new trunk when the old one becomes too stiff. The main trunk should be carried to the lower wire and 2 fruit canes and renewal spurs provided for. The young shoots that spring from these canes and spurs grow upright to the second wire, when they are pinched off and tied. This gives stockier and more mature canes for the following season. Cheap winter protection is obtained by bending the vines to the ground and covering with soil.

The chief value of the *Vinifera* in New York State is as a home-garden grape for the amateur, for the commercial grower supplying local markets demanding high quality, and for the plant-breeder seeking to obtain improved varieties.

Most of the Vinifera varieties have originated in regions with a longer season and a much warmer climate than that of New York and many kinds included in the tests at Geneva have been discarded because, even in the most favourable seasons, they have not reached maturity.

The varieties are classed in 4 groups:— 1) Desirable varieties for the grape regions of the State for *a*) the table and *b*) wine; 2) sorts worthy of testing in the more favourable parts of the State for *a*) table and *b*) wine; 3) kinds still on probation; 4) varieties of little or no value in the State.

After having given an historical account and discussed the work at the Geneva station, the author classifies the varieties in the following manner:—

1) *Desirable varieties for the grape regions of the State of New York*

<i>a) For table use</i>	<i>b) For wine</i>
Bakator	Blue Portuguese
Golden Chasselas	Beclan
Chasselas rose	Kadarka
Chasselas Besson	Meunier
Fehér Szagos	Black Pinot
Kuristi Mici	Pinot de Pernand
Lignan Blanc	White Pinot
Muscat Hamburg	Teinturier
Early Black Muscat	
Muscat Saint Laurent	
Grey Pinot	
Rosaki	

2) *Varieties worth testing in the more favourable parts of the State*

<i>a) For table use.</i>	<i>b) For wine.</i>
Acton	Berzemino (Marzemino)
Cinsaut	Calmette
Early Frankenthal	Grey Chauché (Chauouch)
Gradiska	Franken Reesling (Sylvaner)
Listan	Large Sauvignon
Mamelon	Slankamenka
Poulsard	Syrah

3) *Varieties still on probation*

Carignane	Oliver de Serres
Chardonnay (Chablis)	Quagliano
Lahn Traube (Van der Laan Traube)	Savagnin Rose (Gewurztraminer or Red Traminer)
Malaga	Semillon
Mammolo Toscano	Servan Blanc (Servant)
Mantuo de Pilas	Steinschiller (Rother Steinschiller)
Monica (Canaïolo)	Sultanina
Muscat of Alexandria	Valdepenas
Black Hungarian Muscat	Zinfandel
Large Early Black Muscat	

4) *Varieties of little or no value in the State*

Angelino	Fintendo
Aramon	Green Hungarian
Black Alicante (Black Saint Peter)	Grenache
Black Damascus	Malvasia
Black Morocco (Ribier)	Malvasia Rosario
Black Muscat (Jura Muscat)	Millennium
Cornichon Violet	Pedro Ximines (Pedro Jimenes)
Elbling (Burger)	Schiradzouli
Ferrare	White Muscat (Muscat Frontignan).
Flame Tokay	

The Arboretum of M. P. de Vilmorin at Pezanin (Saône-et-Loire, France), and the Results Obtained There. S. Mottet, in Comptes rendus des Séances de Académie d'Agriculture de France, Vol. IV, No. 5, pp. 175-186. Paris, February 6, 1918

About fifteen years ago M. Philippe de Vilmorin established in Central France, in Charollais, at Dompierre-les-Ormes (Saône-et-Loire), a tree nursery for studying on a large scale under forest conditions, the acclimation and utilization of the forest and ornamental trees, cultivated in his experimental grounds at Verrières (Seine-et-Oise).

The estate, called "Pézamin", is at an altitude of 1276 feet. Forty-four acres of hills are at present planted, all of which slope down to a lake covering 10 acres. The soil is granitic, composed of rock more or less worn away by exposure, the finer portions of which have accumulated in the lowest parts and form the vegetable soil. The soil is very permeable, very poor in lime and clay, and subject to drought in the sloping parts more exposed to the sun. As in many mountains, moist portions are found here and there, giving very vigorous growth. By reason of the altitude the climate is cold, and there is snow for a great part of the winter.

The first plantation was made in 1903, and planting was continued regularly in autumn every year up to 1915. Since the death of M. de Vilmorin the experiments have been continued by Mme. de Vilmorin and the author. Very interesting results have already been obtained. Over 50,000 young trees have been planted, distributed as follows:

	Trees or bushes with deciduous or persistent leaves	Conifers
General.....	91	32
Species or varieties.....	789	206

A fairly large number of trees proved insufficiently hardy, and incapable of thriving under the harsh soil and climatic conditions; these disappeared or only live in a weak state. Unfortunately the war has not allowed a complete list of these trees to be made yet. The winter 1916-17 caused the loss of many trees which had resisted till then, especially of several *Araucaria imbricata*, which froze completely.

As a rule deciduous trees did much less well at Pezanin than the conifers. Nearly all the Juglandaceae succumbed; only a few *Juglans Vilmoriniana* managed to take hold in one part of the nursery. All the *Carya* died. The *Pterocarya* and *Juglans* which have survived have lost all their stem and are growing in bushes from the base. The *Catalpa*, *Paulownia*, some *Acer*, *Aesculus* and *Pavia*, *Fraxinus*, *Gleditschia*, *Tilia*, many bush Leguminosae, and various Rosaceae, are doing fairly well, usually growing from the foot instead of forming a stem.

On the other hand, certain trees, especially common acacia, birch, hornbeam, and *Planera*, in particular, then oaks, willows, and alders, do more or less well, according to the species to which they belong and the place in which they are planted; the depth of the soils, which varies greatly in the different parts, naturally has much influence on their vigour. All oaks do well at Pezanin, but the rapidly growing American species, especially *Quercus coccinea*, *Q. palustris*, *Q. rubra*, *Q. tinctoria*, etc., grow as rapidly as the willows when their roots find a little depth or fissures in the underground rocks; their colours in autumn are very brilliant. Some *Quercus dentata* (*Q. Daimio*), grown in a fresh position, have developed exceeding well after having refused to grow for several years.

Some trees that are usually weakly elsewhere, particularly at Verrieres, have developed surprisingly well. This is the case with *Dirca palustris*, the curious "leatherwood" tree, whose branches are so supple that they can be rolled up like straps; with *Nothofagus antarctica*, which grows almost as vigorously as an elm, which it resembles by its foliage; *Halesia tetrapetra*, the "silver-bell" tree which flowers and fruits in abundance; *Hamamelis virginica* was in flower in November 1917, at planting time; various *Rhododendron* crosses, planted in numbers in a clearing, have taken root and are growing strongly; on the contrary, *Azalea amoena* could not resist the great cold, whilst *Daphne Mezereum album* is growing well, being apparently well suited to the conditions there.

In general the conifers, which form the basis of the plantations, have done the best. Besides the forest trees common to the region, many species, having found suitable surroundings there, have grown up into fine saplings. Shoots over 3 feet high are not uncommon with the Douglas

fir. *Abies balsamea* has found so good a position, fresh and with a northern exposure, that some strong specimens planted in 1907 are now nearly 26 feet high.

Abies arizonica argentea, the famous "cork fir" now diffused in Europe for some 15 years, does splendidly; its thick and conical habit of growth, together with its fine glaucous tint, make it one of the finest conifers in the plantation. *Abies grandis* (Vancouver fir) competes in height with the silver fir and wins by its massive branching system which spreads curiously before it begins to thicken. *Abies concolor* and *A. lasiocarpa* are in perfectly suitable surroundings, and are noticeable for their fine stature and their distinctive blue colouring. *Abies Nordmanniana*, *A. cephalonica* and several other species, do very well, even *A. Pinsapo*, a southern tree; on the contrary, however, *A. cilicia* which begins vegetation early, freezes in spring, and becomes stiff and spindle-shaped.

Several Piceas succeed at Pézanin. Besides *Picea excelsa*, grown as a forest tree, the following may be noted:—*P. pungens* (*P. Parryana* and its very ornamental glaucous forms; *P. Morinda*, whose young shoots are liable to freeze in winter; *P. orientalis*, with its small, close, dark-green foliage, it is very distinctive and grows very well; *P. sitchensis* (*P. Menziesii*), much finer than in the Paris region, too hot and dry for it during summer. On the other hand, *P. ajanensis* does not do at all; *P. Alcockiana* for which it was long mistaken, freezes in spring; and *P. Omorica*, so remarkable at Verrières, remains very poor.

The Atlas cedar and its silvery form, from which such fine colour contrasts were expected, are weakly and without any ornamental effect. The slow-growing bushy foliage of the cedar of Lebanon seems to indicate that the soil is neither sufficiently deep nor sufficiently fertile for it, while the heat is insufficient.

The common larch (*Larix europaea*) is common in the district, and its wood is in great request for its straightness and its quality, superior to that of forest pines; most of the other species do equally well there, including *Larix occidentalis*, as yet still rare in plantations, and whose branches stem more developed than those of the former. But *Larix leptolepis* is much better than the related species for the surprising rapidity of its development, which rivals that of the Douglas fir, and by its fine, straight, clear bole.

Here as elsewhere, the adaptability of the various species of pine seems much more unequal than that of the firs. *Pinus sylvestris* and *Pinus Laricio* are the commonest in the region, where they are of almost equal forest value, the latter giving more wood than the first, but of less value,

at any rate as a young tree. *Pinus Banksiana* and *Pinus rigida* do very well, but not so well as *P. sylvestris*; they are probably preferable to the latter for dry places. *Pinus excelsa* and *P. Strobus* do equally well in Charollais, but their white, soft wood, of low commercial value, hinders their wider growth. *Pinus densiflora* and *P. Thunbergii* which, in Japan, represent our *P. sylvestris* and *P. Laricio*, are of no forestal interest for the region, for they branch and become bushy early, and their branches bend and break easily under snow. *Pinus ponderosa* and its varieties are weakly and its shoots are attacked by *Tortyx buoliana* as is the case in many places. Most of the other pines do not grow very well, and are only of interest in a collection.

In the JOURNAL for August, 1917, there appeared a notice of the death of one of the greatest members of the family who have made the arboretum mentioned above known throughout the world, Phillippe de Vilmorin. Now another member of the family has passed away. From *Horticulture* we reprint an appreciation of Maurice Levaque de Vilmorin, who died on April 21, written by Professor C. S. Sargent:

By the death of Maurice Levaque de Vilmorin the world has lost one of its most esteemed and distinguished dendrologists, best known by the Fruticetum Vilmorinianum which he established in 1896 at Les Barres, near Nogent-sur-Vernisson (Loiret), where he assembled the largest and best arranged collection of shrubs in Europe. The relations Vilmorin was able to establish with some of the French missionaries living in China enabled him to introduce into his collections many Chinese trees and shrubs which before his time were unknown in Europe, and among his correspondents in China are found the names of Delavay, Armand David, Farge and Soulié, now familiar to all students of the Chinese flora. The most conspicuous of the Chinese plants Vilmorin obtained through his missionary friends was the *Davidia*, the tree for which Wilson first went to China.

The Fruticetum Vilmorinianum occupies a part of the Vilmorin estate, on which in 1815 the grandfather of Maurice, André Levaque de Vilmorin, planted an important Arboretum which has now become the property of the state and is known as L'Ecole Forestiere des Barres. The Fruticetum Vilmorinianum supplemented the Arboretum and the two collections have made Les Barres one of the most important of all dendrological stations.

Maurice Levaque de Vilmorin paid two long visits to the Arnold Arboretum and was one of its constant and most valued correspondents. Many plants, including the largest collection of American Hawthorns in Europe, first raised at this Arboretum, are now growing in the Fruticetum Vilmorinianum, and to his generosity the Boston Arboretum owes many of its rare and interesting plants, including the first *Davidia* which ever reached the United States. An interesting account of the Fruticetum Vilmorinianum from the pen of Edward André is printed in the *Revue Horticole* for 1900, and in 1904 Vilmorin published a preliminary catalogue of his collections with descriptions and figures of rare and little known species.

Naturalizing of Digitalis

The old fashioned Foxglove is one of the best subjects for naturalizing in wild or woodland garden; masses of them growing with wild ferns give a most charming effect.

If the soil is fairly good, but little preparation is needed, a thorough raking of the spots where seed is to be sown is all that is necessary. If the soil is in poor condition, prepared beds or patches should be made. Mix seed with good light soil and sow thinly broad-cast in spring as soon as ground can be worked. The young plants should be kept free from weeds until established. —G. W. WYATT.

Grouping Hypericums

The taller growing shrubby Hypericums, with dwarf varieties planted between to form a ground work make a very pretty group, and are especially useful as they bloom when few other shrubs are in flower. *H. prolificum*, one of the best taller growing varieties is quite hardy and needs but little pruning; one must, however, cut back straggling shoots and old flower spikes. *H. moserianum*, the best dwarf variety needs protection in winter, cover right over with about 6 inches of leaves and half rotted grass, in spring cut back close to ground; the young shoots grow quickly and flower from July to October.—G. W. WYATT.

Rear Admiral Aaron Ward, known throughout the country as a rose fancier, died on July 5 at his home, Willowmere, Roslyn. He had a distinguished record in the Navy and after his retirement in 1912, lived in Roslyn, where he spent his time cultivating roses. His garden was known throughout this country and Europe. He kept a log in which he recorded the date of planting of each rose bush, and its progress. He was accustomed in the summer to rise at 5 o'clock in the morning to cultivate his flowers. He wrote a little book called "One Year of Rose Work," the proceeds of which he gave to the American Ambulance Fund. In his garden he had more than 3,000 rose bushes, and when he exhibited it for charitable purposes persons came from great distances to see it. The well known specimen Mrs. Aaron Ward, was named for his wife, who studied rose culture under M. Pernet, the famous French floriculturist. The Rear Admiral kept a ship barometer in his garden to guide him in his planting and cultivating. He made numerous contributions to the journals that dealt with his favorite flower.

In 1914 Rear Admiral Ward commanded the relief ship Red Cross sent to Europe by the American Red Cross with physicians and nurses to aid the sick and wounded. Emperor Francis Joseph awarded him the Medal of Merit in December for the Red Cross aid he had brought to Austria-Hungary.

The Rear Admiral was an authority on torpedoes and high explosives, and was one of the most proficient linguists in the Navy, conversing fluently in five languages, one of which was Russian.

Drought

This is the worst thing gardeners have to contend with in July and August. It comes every summer and attacks every crop.

Two treatments can be used in fighting dry soil. The first is, handle the soil in a way to prevent evaporation; and the second is, add water by some system of watering. To prevent evaporation of water from the soil, keep the upper inch or two inches of soil as fine and dry as dust by cultivating the garden once a week. For this purpose nothing surpasses a small wheel-hoe or a horse cultivator for larger areas. The simplest and commonest means of watering is by use of sprinkling can, or hose or pots. It is possible to do more harm than good unless the hose is properly used. Water should be applied in the late afternoon. A slight sprinkling on the surface is of little use because it stimulates only the roots near the surface which are most exposed. A thorough soaking once a week, followed by cultivation, is more effective. Overhead irrigation systems can be erected for almost the same cost as hose equipment. A storage tank or pressure system is necessary for best results in watering a garden.—S. M. BEER.

Carpe Diem

If this were my last day I'm almost sure
I'd spend it working in my garden. I
Would dig around my little plants and try
To make them happy, so they would endure
Long after me. Then I would hide secure
Where my green arbor shades me from the sky,
And watch how bird and bee and butterfly
Came hovering to every flowery lure.
Then, as I rested, 'haps a friend or two,
Lovers of flowers, would come, and we would walk
About my little garden-paths, and talk
Of peaceful times, when all the world seemed true.
This may be my last day for all I know:
What a temptation just to spend it so!

ANCHUSA.

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It was the winter wild,
While the heav'n-born child,
All meanly wrapt in the rude manger
lies;

Nature in awe to Him
Had doft her gaudy trim,
With her great Master so to sympa-
thize.

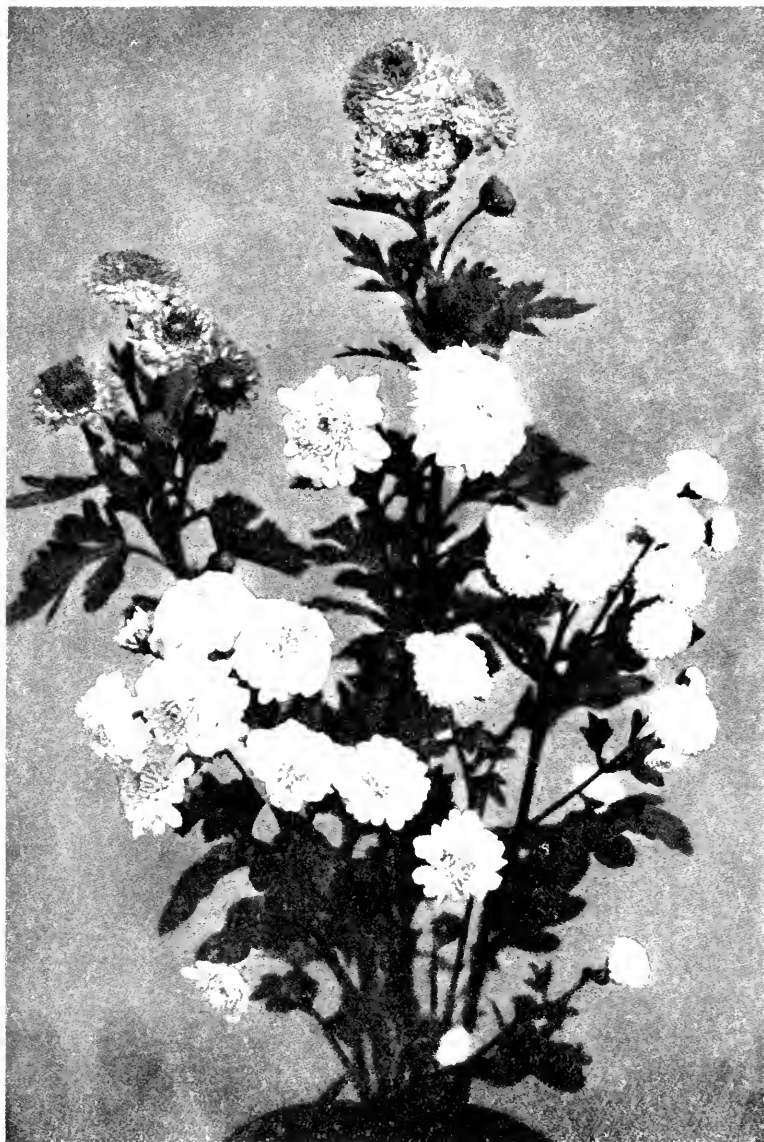
But He her fears to cease,
Sent down the meek-ey'd Peace;
She, crown'd with olives green, came
softly sliding,
Down through the turning sphere
His ready harbinger,
With turtle wing the amorous clouds
dividing;
And waving wide her myrtle wand,
She strikes a universal peace through
sea and land.

—Milton.





THE CHRISTMAS ROSE
HELLEBORUS NIGER



POMPON CHRYSANTHEMUMS|
GROWN IN BORDERS

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INTERNATIONAL GARDEN CLUB

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Border Chrysanthemums^{*}

By Thomas Stevenson, F.R.H.S.



HE term "Border Chrysanthemums" is applied to varieties which flower successfully in the open air before the advent of severe frost, and as this section is now a very large and varied one no apology should be necessary for my endeavour to still further popularize what

I consider to be one of the most useful plants in cultivation.

I have heard it remarked by many that they do not like to see Chrysanthemums flowering in the borders, for they look upon them as a sign that winter is at hand. There are others, and I am one of them, who are pleased to see the waning summer, as it leads on to the blooming period of various plants that are much less fleeting in character than those that flower during the heat of the year, and I am sure everyone will agree that the Chrysanthemum is one of the most lasting of all flowering plants, whether cultivated in the open ground or in pots for decoration in late autumn and winter.

^{*}Reprinted, with permission, from the *Journal of the Royal Horticultural Society*. It should be noted that the varieties mentioned at the end of the article have been based on English experience and not all of them are certainly hardy in the North.—Ed.

In conversation recently with one of our largest growers of cut flowers, a man whose aim is to put large quantities on the market every weekday during the year, and who naturally puts sentiment on one side in his endeavour to make the business profitable, chanced the remark that he was always pleased when the early Chrysanthemums were ready to market, as he felt, whatever the public were paying for the flowers, they were at least getting value for money, and I entirely agree with him. Whether the Chrysanthemums are grown for display in the garden, or for cutting for indoor decoration, whatever time and trouble expended on them is amply repaid by the beautiful effects obtained and the length of time the flowers last, whether on or off the plants.

Every real gardener and garden lover thoroughly appreciates the effects produced by the various classes of plants in their seasons, but at no season of the year do we see anything that is more in harmony with its surroundings than are the various shades of yellow, bronze, and crimson of Chrysanthemums, and when these are planted close to shrubs whose foliage changes with the shortening days they provide a wealth of colour-blending that would need a clever artist to depict, and someone with a better flow of language than I to describe.

In my paper—a year or two ago—on Chrysanthemums in pots, I ventured to remark on the great quantities that were grown for use as cut flowers, and those who have been privileged to see some of the great cut-flower producing establishments have not only marvelled at the enormous number of plants grown, but also at the high standard of cultivation, and I should certainly like to see this class of Chrysanthemum taken up with more enthusiasm by the private gardener and amateur generally.

At the present time there is unlimited choice of varieties, as during the past fifteen to twenty years much progress has been made, and many good raisers have worked hard to improve them.

Previous to this, however, the number of good varieties was very limited, and the date of flowering of most of them was

rather too late for them to be termed early-flowering Chrysanthemums. The comparative hardiness and the power of frost resistance possessed by these short-petalled varieties, however, were great, and even as recently as last year I saw some of them flowering away quite freely in December and when on a visit to Scotland a year or two ago, about the third week in November, practically every garden by the roadside had masses of these old, as well as some of the newer varieties in bloom. This is only an instance or two of their hardiness; much more, however, may be said of their general usefulness, and I hardly think I should be exaggerating if I said that Border Chrysanthemums can be grown wherever there is a small garden or borders, and I have seen quite good displays in such poor receptacles as herring boxes. Furthermore, they are not averse to the conditions prevailing in large towns, in fact they seem to revel in a smoke-laden atmosphere, and many of the finest displays of Border Chrysanthemums I have seen have been in the smoky districts in and around London.

Several of the London parks and open spaces have been and are still noted for their annual displays of Chrysanthemums both under glass and in the open beds and borders, and it must be a pleasure to those responsible to see how thoroughly their efforts are appreciated by the great numbers who visit the parks during the time they are in bloom.

If under such conditions Border Chrysanthemums will make a good and lasting show, how much better should they be where the nature of the soil, climate, and atmospheric conditions are ideal! Gardeners generally would do well to try to emulate the example set by the market growers whose plants are perfect specimens of good cultivation and the flowers such as would lend themselves to any scheme of decoration.

The Border Chrysanthemum is no new type of the flower, though it has been improved almost out of knowledge both as regards the date of flowering and in the number and beauty of the varieties.

Mr. Harman Payne, in a paper on the subject in 1906, mentioned that the first early-flowering Border Chrysanthemums



MERCEDES, AN
EARLY FLOWERING
VARIETY

made their appearance in this country in 1852. These were no doubt Pompons. In 1865 Mr. John Salter gave a list of fifteen summer-flowering varieties in his work, *The Chrysanthemum—its History and Culture*. In 1869 “Sœur Melaine” was introduced. Many of us know this variety, and quite recently I saw it growing.

“Madame Castix Desgranges” was introduced a few years later, in 1873 or 1874, and it and its sports are still grown and, I believe, sent to market, though I doubt the wisdom of this, seeing the number of better varieties we now have. This variety, however, established the popularity of the early Border Chrysanthemum, and after its appearance we soon began to get others of the large-flowering or Japanese type.

The Massé family was another notable introduction, and “Madame Marie Massé” and its sports are still grown in hundreds of thousands, both for cut flowers and in small pots for decorative purposes.

This family gave us a greater range of colour in the larger-flowering type than heretofore and added greatly to the interest in the flower. It is since its introduction that the greatest strides have been made in the colour and type of flower and in the habit of the plant. Naturally, different raisers are striving after different ideals, and whilst some endeavour to get varieties of close, compact habit for the embellishment of the garden, others, chiefly growers of cut flowers for market, prefer good strikingly coloured varieties on fairly long stiff stems which, when disbudded, give blooms of from four to six inches in diameter or quantities of good light spray flowers after the type of “Roi des Blancs.”

One other type of the flower which I have so far failed to mention is the early-flowering single. This is, I believe, of a much later introduction, very few varieties, if any, being introduced before 1900, and it is to our late friend W. Wells of Merstham that we are indebted for many of the better varieties. In one season alone he planted out 20,000 seedlings, thus showing his great interest and enthusiasm for the new type of flower; and, though I cannot say that I prefer it to the

Pompon and Japanese types for outdoor cultivation, there are many varieties that are bright and effective in the garden, and as they yield an abundance of bloom they are most useful for decorative purposes in the house. Where they really fail is that they do not pack well, the single or double rows of florets being somewhat easily damaged, and thus their beauty is spoiled and their sphere of usefulness limited.

This very brief résumé of the history of the flower is quite sufficient to show that the plant has been developing in this country for well over half a century. Though the Pompon was the original, we now have three distinct types, Pompons, Japanese, and Singles, all of which are useful, and when we consider that by their aid we can prolong by a month or two the displays of bright flowers in our beds and borders, and also secure large quantities of cut flowers for the decoration of the home up to the end of October, such plants deserve more than ordinary consideration.

The several ways in which these Border Chrysanthemums can be utilized are well worth a word or two. They will grow in any kind of garden soil and in almost any position, and if this is not too moist will live through the winter and go on blooming year after year, but such treatment I do not recommend, as it is not conducive to the best results. Planted in fairly large clumps in the herbaceous border they are quite at home, and, providing due consideration is given to the selection of varieties, they add greatly to the charm of the border during the late summer and autumn.

Planted in beds of fair size—either one variety or two or three selected for their height and colour—if the beds are on a fairly expansive lawn they make a brave show, and under such conditions are perhaps seen at their best. It is not necessary to grow them in such beds all the summer, but they may be removed thence just previous to flowering.

In or around the edges of open or newly-planted shrubberies they can be utilized with much effect, and it is in such positions that the stools may be left a year or two, and I have known instances where the “Massé” family have done much



DISBUDED FLOWERS OF
DELIGHT, AN EARLY FLOWER-
ING VARIETY

better, treated in this way, though, generally speaking, young plants put in each season produce by far the best results.

Grown in large tubs, pots, or boxes they make exceedingly good decorative subjects and add considerable colour to the terrace or verandah during September and October, varieties that are of suitable habit and colour for the purpose in view being selected.

For cutting purposes they are best cultivated in a border or in beds in the kitchen garden, where their wants can be properly attended to, and, though without any protection whatever, good results are obtained. A little provision for protecting the flowers in case of early frost or prolonged moisture during the opening stages is amply repaid.

As a market subject the border or early-flowering *Chrysanthemum* is extremely popular, and its cultivation is carried out on a very extensive scale. As direct evidence of this one has only to visit one of the large markets any morning during the season, and anyone not familiar with the subject would indeed wonder where such enormous quantities of flowers came from. On the other hand, if one were to see the nurseries of such growers as Ladds of Swanley, Mizen of Mitcham, Cragg, Harrison, and Cragg of Heston, Lowe and Shawyer of Uxbridge, or many others that might be mentioned, the wonder would be even greater and the question would immediately be asked, "Wherever do such quantities of flowers go to?" The growers, however, are only catering for the public demand, and rarely is the supply greater than the demand. Even if there is a glut it is usually of the lower grades, and not the better class of disbudded blooms.

I have already mentioned how well they are cultivated by the growers for market; growing them as they do in such huge quantities, they become acquainted with the exact requirements of each variety and treat them accordingly. In comparison with the quantity of plants the number of varieties grown is small, and it is indeed a good variety that passes muster with the market grower. Not only must the colour be right for selling, but the habit and cropping qualities must

be good as well, and the florets of such texture or substance that they are not easily damaged in packing, and are still fresh after being out of water from twelve to twenty-four hours. The last is a severe test, and anything of a soft or flimsy nature is soon cast aside, buyers quickly recognizing those that do not give satisfaction.

In dealing with the cultivation of a plant it is usual to commence with the propagation, but before doing so I should make it quite clear that Border Chrysanthemums under fair conditions will live and flower well for quite a number of years, practically without any attention, and the fact of their being left to themselves tends to make the plants hardier. The soil which they are in naturally becomes poor and the growth less rampant each succeeding year, and so the stools get harder and the young growths in the spring less vigorous and consequently more likely to come through the spring safely than young plants put out in well-prepared ground the previous spring. The latter often throw up very vigorous growth from the base during November and December, and it is this class of shoot that very quickly succumbs to frost.

Those who are desirous of cultivating the plants on these lines would be well advised not to cut back the plants too hard after flowering, but rather to let them die back naturally after the flowering shoots have been cut. If cut down, say, to within six inches of the ground while the roots are still active, they are apt to bleed and the constitution of such plants is ruined, so when planting to establish Border Chrysanthemums permanently—that is without propagating each spring—it would be best to plant in soil not too rich, and in selecting the position let it be one that does not lie too wet during the winter.

A very simple method of propagation, and one best suited to the amateur and owners of small gardens without glass accommodation, is to lift the plants that have flowered the previous autumn some time during April, pull off the young growths, which by this time are throwing up well from the base and are usually well rooted, and plant them in the borders.

They will make good plants by the autumn; five to nine such shoots planted about a foot apart make really effective clumps. The only things likely to injure them are slugs, but a slight dusting or two of soot in the early stages will invariably ensure them against much damage. Any quantity of plants may be raised in this way, and for an ordinary display in the borders any other form of propagation is really unnecessary.

Where, however, a specialty is made of Border Chrysanthemums or where they are required in quantity for cutting purposes, it is usual to propagate them under glass, the date of propagation varying from the end of January to March, and except in the case of particular varieties there is little to be gained by early propagation. Cuttings inserted the first or second week in March make good plants by the end of April, which even in a very favourable district is quite early enough for planting. May is the best time for planting in most districts, and so the date of propagation must be governed somewhat by the proposed date of planting, and of course by the class of plant desired at planting time.

To ensure good cuttings the care of the stock plant is important, and where possible these should be lifted in the autumn before the advent of severe frost, and placed in a cold house or frame where frost can be excluded, lightly covering the roots with fine soil. Very little or no water will be necessary during the winter months, but plenty of ventilation should be given. Many shoots will be thrown up during January and early February, and usually they are pretty strong. They should be removed with a knife at or just beneath the surface of the soil and thrown away, and the next lot of cuttings, though not so strong, will be better and likely to root more evenly than the first, the lengthening days and stronger light keeping them harder. A moderately hard cutting not only roots quicker but emits many more roots than a large sappy one and the growth of every plant is governed by the amount of serviceable roots it has.

A light sandy compost should be used for propagating, but whether this is made up in the form of a bed in a moderately

cool house or frame or in boxes is quite immaterial, either method having its advantages; but it is essential for the cuttings to be made quite firm in the compost and well watered in, afterwards keeping them close till roots are emitted, when the young plants should be gradually hardened off by giving more air day by day.

Where only a few dozen plants are grown it may be an advantage at this stage to pot them off singly into small pots, but where they are being cultivated in large numbers this is unnecessary, the best plan being to box them off or plant them out in three or four inches of soil in frames at from four to six inches apart.

It may be necessary to keep them close for a few days after potting or replanting, but great care should be exercised, as too free growth is the one thing to be guarded against, and for this reason also the watering must be very sparingly done, particularly if they are planted out, just sufficient being given to prevent flagging. Once they have lifted their heads after replanting or potting plenty of air will be necessary to ensure sturdy growth, and as at this date the days generally will be fairly warm the lights should be removed entirely whenever the weather is fine.

Potted plants will take a great deal more water when they become well rooted than those planted out, and though I strongly urge the necessity for care in this direction they must not be stunted by being kept too dry.

Sometimes during April aphides will make their appearance in the points of the shoots, but one or two light sprayings with an insecticide will quickly eradicate this pest. Towards the time for planting out the lights should be removed night and day, and everything done to ensure hardiness in the young plants.

The preparation of the soil is an important matter, particularly if they are to be grown in quantity for cutting. Very deep digging or bastard trenching during the winter or early spring is a good plan to adopt, doing this sufficiently early to allow the soil to become ameliorated by the action of the

weather and to consolidate slightly. The amount of manure to be added should naturally be varied according to the nature of the soil, but rarely should it be necessary to dress the ground heavily with fresh manure.

In private places where batches of plants are grown for cutting in the kitchen garden, or borders adjacent thereto, and which may have been well manured for previous crops, little or no manure should be given, as I have found that plants which grow away very freely in the early stages do not produce such good quality bloom as those grown more steadily and well fed after the appearance of the flower-buds.

Stations that are reserved for *Chrysanthemums* in the herbaceous borders may be rather more liberally treated, as the permanent occupants of the borders will naturally take a good deal of the nourishment out before the *Chrysanthemum* roots get well started.

It must not be inferred, however, that *Chrysanthemums* will give the best results from an impoverished soil. They will not! A well-worked soil not too rich in nitrogenous manure, which will give good steady growth from the outset, is far the best, and it is much easier and less wasteful to add or give manure later in the season than to try to check the growth of plants which are making far too much soft wood through a superabundance of manure at the outset.

When the plants are being grown for lifting and transferring to flower-beds in the early autumn, the soil should be such as will produce plenty of fibrous roots, and if it is not naturally fairly light the addition of leaf soil, spent hops, or old mushroom-bed manure will help it in this direction; a good autumn display might easily be spoilt if—when lifting—the roots come up without a good ball of soil.

The date of planting will vary a little in different localities and seasons; it may be safe to plant the first week in May or even a little earlier on moderately light soil and in a warm neighbourhood, but when the soil is heavier and the locality subject to late frosts it may be necessary to defer it to the third or last week in the month, and though some varieties, if

well hardened, will stand a little frost, there are others which suffer considerably, and so it is not wise to take too many risks.

Firm planting is essential, and it is detrimental to plant when the soil is in a wet condition, the plants getting away much quicker when it is nice and friable.

The distance they should be planted apart will depend somewhat on the varieties. Pompons may only require from eighteen to twenty-four inches each way, and in light soil even less, but the stronger-growing Japanese type should be from two to three feet apart, a good plan being to plant in double rows two feet apart and two feet from plant to plant in the rows, and a distance of three between each pair of rows. This saves space somewhat and yet gives plenty of room for working between the plants during the growing season.

Some time during the season the plants will require staking, and probably the best and quickest plan is to put the stakes in before planting out; if this is done the young plants may be tied as soon as they require it, and the rows or beds will be much more tidy in appearance than when the stakes are put in at a later date.

After planting, the ground should be frequently hoed. This operation serves the treble purpose of keeping down weeds, promoting healthy growth, and during dry weather checking the loss of moisture. If it is systematically done very little watering should be required, and certainly none till near the flowering period.

When the flower-buds are showing, the treatment should be more liberal, and both feeding and watering must be regularly attended to. It is difficult to say how much water and manure should be given, this being governed by a variety of circumstances. Heavy soils may require very little, whilst on light porous soils a feed and good soaking of water every week or ten days would not be too much. It is astonishing what difference proper attention in this respect makes to the colour and general quality of the flowers.

Disbudded plants for cutting, I find, like even more generous treatment than those grown for sprays or for a border display,

and a severe drought after disbudding not only prolongs the time they are opening but robs them of colour and size.

During the growing season the plants are liable to be attacked by greenfly and thrips, but the treatment suggested for the young plants will keep both these pests under.

The worst enemies of Border Chrysanthemums, at least where they are being grown for cutting, are two small bugs which attack the points of the shoots during August and September, piercing the stems, thereby checking the growth, and deformed flowers are the result. Mr. Wells, in his book on the Chrysanthemum, fully describes them. Since he wrote this, however, these pests have become very troublesome in some localities, almost ruining the crop of bloom on certain varieties. Both are difficult to deal with, and the only remedy I can at the moment suggest is to spray regularly with nicotine insecticide.

Plants for ordinary garden decoration are best allowed to grow quite naturally. The introduction of any system of stopping involves a greater amount of tying, which tends to a stiffer appearance, and in the borders this should be obviated as far as possible and varieties selected that require little or no staking.

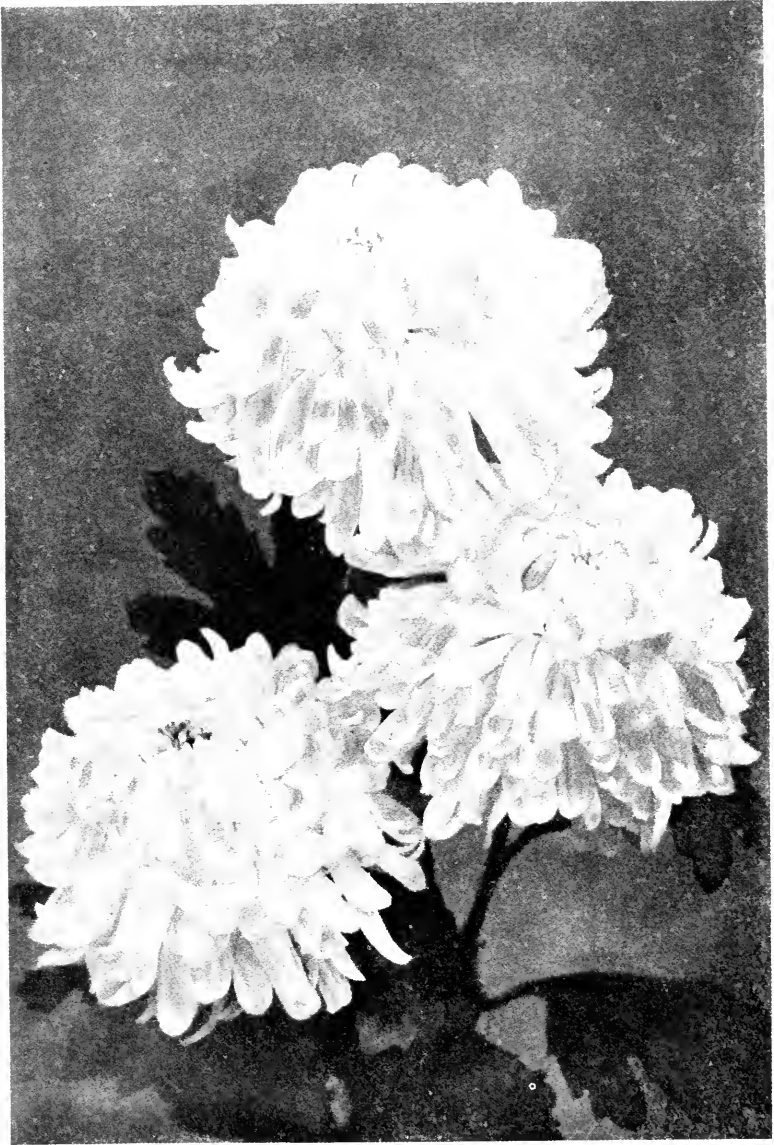
When growing for cut flowers, whether for sprays or disbudded blooms, it is sometimes advisable to take out the points of the plants at or about the time of the first natural break; this conduces to a more even set of shoots, and where it is desired to retard the flowering period of a variety they may be stopped again, afterwards restricting the shoots to the number required on each plant. Generally speaking, the first week in July is late enough for this purpose in the south; further north this second stop may not be necessary, and in the case of some of the later-flowering varieties it may even be necessary to anticipate the natural break by stopping earlier, thus inducing the bloom buds to appear at an earlier date; this applies chiefly to plants being cultivated for the production of disbudded blooms.

Plants for a supplementary display in the flower-beds or borders should be treated as already advised, lifting them soon after the flower-buds are well set. Needless to say, they should be well watered a day or two beforehand, and if a showery time is chosen so much the better, thereby lessening the check. Care must be taken to lift them with as much soil adhering to the roots as possible, watering them in well after replanting, and giving them a light spray overhead for a few days while there is any tendency to flag. Excellent results are obtained in this way.

As mentioned at the outset, varieties are very numerous, some five hundred having been on trial at Wisley in 1914, and the certificated varieties and Committee's selection will be found in the Society's Journal for April 1915. This in itself is a good guide, but as varieties differ so much in different localities it is sometimes wise, before planting, to make a note of those which do well in the neighbourhood. However, I have been interested in this subject for a number of years, and venture in conclusion to give short lists of varieties for various purposes in the hope that they may be of service.

Varities for Disbudded Blooms

White	{ Candida	Yellow	{ Knaresboro' Yellow
	{ Framfield Early White		{ Mrs. R. Hamilton
	{ Débutante		{ Mrs. G. Wermig
	{ Madame Castix Des-granges		
Pink	{ Cranford Pink	Bronze and Chestnut Shades	{ Almirante
	{ Delight		{ Eldraco
	{ Fée Parisienne		{ Dolores
	{ Consul		{ La Pactole
Yellow	{ Uxbridge Pink	Crimson	{ Nellie Blake
	{ Cranford Yellow		{ Emperor
	{ Cranfordia		{ Alcalde



DISBUDED FLOWERS
OF FRAMFIELD EARLY
WHITE

Varieties for the Garden or for Cutting as Sprays

White	{	Madame Castix Desgranges	Yellow	{	Carrie
		Roi des Blancs			Leslie
		Market White			Horace Martin
		Perle Châtillonnaise			Elstob Yellow
		Betty Spark			Polly
Blush Pink	{	Dorothy Ashley	Bronze and Chestnut Shades	{	Cranford Yellow
		Hector			Jas. Bannister
		Lillie			Diana
		Marie Massé			Ryecroft Glory
		Provence			Mrs. J. Fielding
		Normandie			Almirante
		Patricia			Hollicot Bronze
	{	Fée Parisienne	Shades	{	Abercorn Beauty
					Miss Balfour Melville
					Nina Blick
Crimson	{		White	{	Dolores
		Alcalde			<i>Pompons.</i>
		Crimson Polly			White Pet
Purple	{	Goacher's Crimson	Yellow	{	Flora
		Claret			Piercy's Seedling
<i>Singles.</i>			Yellow	{	Mrs. A. Thomson
White	{	Mrs. Earle			Mignon
Yellow		{	White City	Golden Petite Marie	
Bronze	{	Golden Firebrand	Blush Pink	{	Blushing Bride
Purple	{	Brazier's Beauty	Bronze	{	Bronze Bride
Crimson	{	Kitty Riches	Purple	{	Anastasia
		Carrie Luxford	Orange	{	Madame Lefort
Crimson	{	Firebrand	Crimson	{	Little Bob
		Kate Westlake			Crimson Précocité
			Chestnut	{	Bijou

French Gardening

By William Robinson

NOTE BY THE PRESIDENT OF THE INTERNATIONAL
GARDEN CLUB



IN THIS number we print a series of articles on French gardening written many years ago, but so interesting and applicable to-day and full of ideas which could be easily adopted to the great improvement of our gardens that I have asked the editor to publish them as they are.

ZELIA K. HOFFMAN.

Training



RAINING is very much better understood in France than in the British Isles (or in America). In France the commonest laborers frequently possess a knowledge of pruning and conducting a tree, which we might look in vain for anywhere in this country; and by way of illus-

trating their skill in this way, we cannot do better than examine their means of forming two of the most popular forms of fruit trees—the Palmette Verrier and the Pyramidal Pear trees—chiefly after Du Breuil. The Pear will serve to illustrate training and pruning as well as any other tree, or better, and the principles laid down will apply equally to other fruit trees.

THE PALMETTE VERRIER. Wherever large wall trees are grown, the simple and beautiful form known to the French as the Palmette Verrier is sure to obtain a place among them. It is indeed the finest of all large forms, and is preferred by many of the best French cultivators to any other. They use it for other trees besides the Pear; and by far the finest Peach tree I have ever seen was trained after this method near Lyons. The English reader may think it impossible to attain such perfect shape as is shown in the accompanying picture, and such perfect equalization of sap as it suggests; but I have seen several trees even more beautifully finished than the one represented. Figure one also shows the advantages of the kind of support used in France for espalier trees as compared with our own ugly method of using rough wooden and iron posts and strong bolt-like expensive wire. It will be seen that the tree differs radically from the usual form of Pear tree that we are in the habit of placing against walls, and it is easy to point out its advantages in securing an equal flow of sap to all the branches.

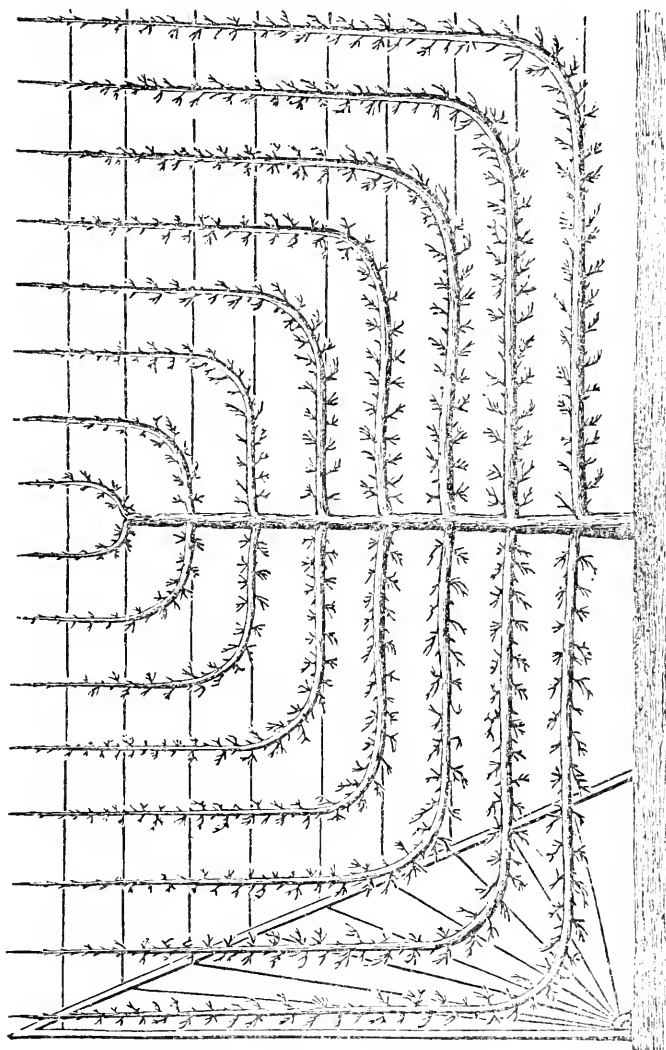


FIG. 1. PEAR TREE TRAINED AS "PALMETTE VERRIER"

In the common horizontal form strength and fertility are apt to desert the lower branches, in consequence of their not possessing a growing point to draw the sap through, and particularly when constant care is not taken to repress, by summer pinching, the upper portion of the tree. The forms here figured, in common with all very large wall and espalier trees, takes a long time to complete. Given a wall 10 ft. or 12 ft. high, and 20 ft. or 24 ft. long, to be covered with a tree of this shape, it would require fifteen or sixteen years to form it. By adopting a more contracted form based upon the same plan, we may cover the wall or trellis more quickly.

The *Palmette Verrier** is named after the fruit gardener at the École Régionale de la Saulsaie, with whom it was first observed. To form the tree, we have in the first instance to plant an ordinary young plant of a desired kind, and of course that should be of the primest kind, both as to quality and constitution, as so much care is about to be exercised to make it a handsome and long-lived ornament to the garden and valuable aid to the fruit room. In forming this as all other

* In my own garden at Armsea Hall, Newport, I have a very good example of the iron trellis described here by Mr. Robinson, which is equally useful for fruit or flowers.

Some years ago while I was in Nice, France, I had about three hundred feet of just such a one made by M. Pin, the ironmonger, and sent over to Newport—the only difference being that it arched over the top and was used to form a covered walk, and for Dorothy Perkins roses, not fruit—but the system of training is precisely the same. In September and October the long new growth of the summer is trained over the trellis and the old or superfluous canes are cut away. After the work is finished the fan-like appearance of each section is precisely similar to Mr. Robinson's illustration. Each branch must be tied to the wire by raffia and of course this takes long, but there is no more delightful occupation than this in the month of September;—to work at an established, beautiful and artistic piece of gardening. It is like doing embroidery—only one's worsteds are living branches.

My Rose Walk has now doubled in size, as I had our local workman copy exactly M. Pin's trellis. It takes at least ten days to accomplish the training, but when the roses are in bloom from July 27 (as that is almost the date to a day that they begin blooming each year) to the middle of August, they are a wonderful picture which people come from far and near to admire. It has now been in existence for over ten years and the training that is given it is *con amore*. So I can recommend these trellises equally for fruit or flowers, and as divisions in a kitchen garden they are charming as cordons of fruit, or as a background to tall perennial Asters, *Boltonia*, *Helianthus* and Marigold, to hide the vegetables in their declining stages.—Z. K. H.

trees, the usual and most economical custom is to choose plants about a year old from the time of grafting, or what are usually called "maiden plants," and which when planted are cut down to within about a foot of the surface of the soil. Three well placed buds are allowed to remain and form three shoots. The two side ones go to form the lowest and longest branches of this handsome form of tree, and at the second pruning the young trees would have somewhat the appearance of that stage in Fig. 2. It is quite easy to buy trees a little more advanced to make the same form more quickly; but they will be more expensive the further they are advanced beyond what is called the "maiden" stage. The young trees should be allowed to remain a year or so in their positions before being cut, so that

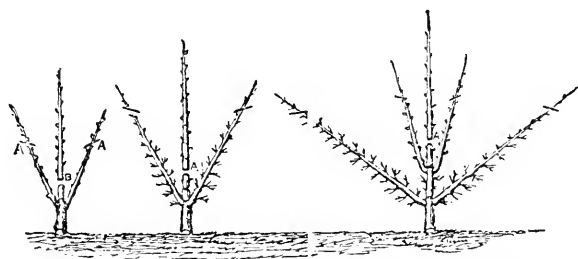


FIG. 2. THE PALMETTE VERRIER
SECOND PRUNING THIRD PRUNING FOURTH PRUNING

they may have rooted well. At the first pruning the young tree is cut down to within a foot or so of the ground, and just above three suitable eyes, one at each side to form the two lowermost branches, the other a little above them and in front to continue the erect axis. Of course all the eyes, except those that are to send forth the three first shoots, must be suppressed in spring. Now, although the tree in the picture looks so very exact and regular in its lines, and the branches appear as they had been "bent in the way they should go" at a very early stage, it is not so; they are at first allowed to grow almost erect, and are afterwards gradually lowered to the horizontal position. During the first year of the young tree possessing three shoots, care must be taken (as at all times) to secure a perfect

equilibrium between them. If one grows stronger than the others, it must be loosened from its position on the wall and lowered. This will divert the sap so as to strengthen the rest. Nothing is more easily conducted than the sap when we pay a little attention to it; if not, it soon rushes towards the higher points, and spoils the symmetry of the tree.

We then, at the second pruning, have to cut them at B, and also cut off about a third of the length of the side shoots, as at A A, Fig. 2 "second pruning." If one side branch happens to be stronger than the other, cut the stronger one somewhat shorter. In cutting and pruning wall trees the cut should be made above a front bud, so that the wound made by the knife may be turned towards the wall, and away from the eye, from which, of course, it soon will be effectually hidden by this front bud pushing into a shoot, and thickening at its base. During the second year no more branches must be permitted to grow, simply because the trainer desires to throw all the strength he can into the lower branches, which are to be the longest. Sometimes, however, the strength of the lower branches will permit the second stage of branches to be made during the second year of training. At the third pruning the trees will present somewhat the appearance of Fig. 2, the central stem being cut at six inches or so above the previous incision, which is indicated by a slight ring, and a third part of the new growth of the side branches cut off, as shown on the side branches. Here, again, we cut above and inside of three promising eyes to obtain a new set of branches, and each succeeding year add another series until the tree is formed. The right hand sketch of Fig. 2 represents the aspect of the young tree at the fourth pruning. At the end of the following growing season the specimen will have grown sufficiently to allow the lower branches to be turned up towards the top of the wall, and begin to look shapely. Fig. 3 is an exact representation of what it ought to be at that stage—A, and the cross marks indicating where the cuttings are to be made. Above all things is it necessary to keep the growth and flow of sap equal, not only for the sake of symmetry, but also to insure perfect health and fertility; for if one par. be

allowed to grow grossly at the expense of another, an awkward state of things will soon take place. Sometimes, when the vegetation is very vigorous, time is gained in the making of this form by pinching the central growth at eight inches or so above the highest pair of opposite branches. It then breaks again, and care is taken to secure two side shoots and one erect one. Thus, with care, and in good soil, two stages of branches may be secured in the same year, but this must not be attempted till the proper formation of the two lower branches is secured. The dotted lines in Fig. 3 will show the positions that have been successively occupied by the branch E, when

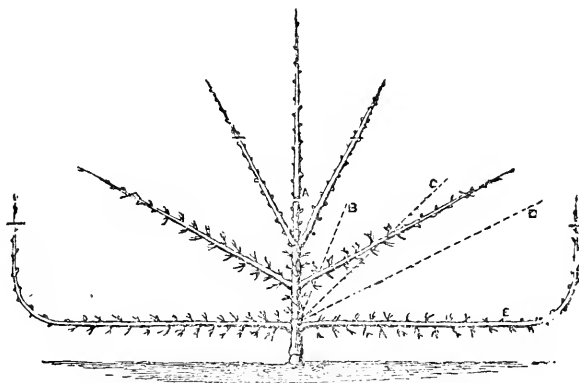


FIG. 3. THE PALMETTE VERRIER
FIFTH PRUNING

in course of formation, and that it is by no means necessary to train a young branch from the beginning in the exact position it is required to take. In fact, this form is only to be well and easily perfected by allowing the young shoots to first grow and gather strength in an erect or oblique position. The branch E kept company when young with the central branch, and was at B; then it was lowered to C, next year to D, and finally to its horizontal position. Some care is required to make the bend of the shoots equal and easily rounded. If the tree be trained on a wire trellis, it is best to place two bent rods in the exact position necessary, and before we require the shoot

to be bent. They must be placed at exactly equal distances from the main stem, and be equal in curvature. Then it is an easy matter to gently attach the growing shoot to them; it will soon harden to the desired bend. Against a wall it will be easy to direct it with shreds and nails; if the wall be wired the bits of bent twig may be applied, as on the trellis. Like care should be bestowed upon the other bends, as they require to be made; but of course the outer and lower one is of the greatest importance. As this form is not at all presentable if the outer branches be incomplete, grafting by approach is sometimes employed to repair this defect, as shown in Fig. 4.

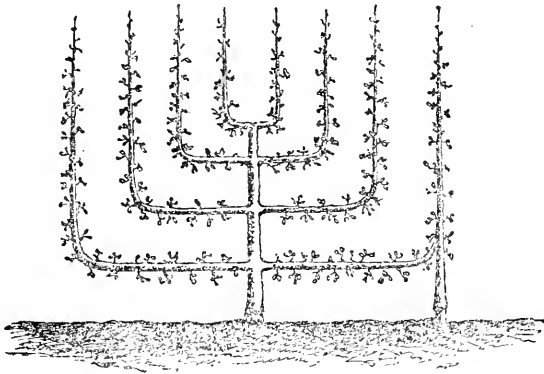


FIG. 4. PALMETTE VERRIER, WITH WEAKLY OUTER BRANCH COMPLETED BY GRAFTING

The reader will observe that, in the formation of this Palmette Verrier, the custom is not to attempt training the young shoot in the position it is finally destined to occupy; but, on the contrary, to permit it first to grow sometimes in an erect, or at least in an oblique direction, so that the sap may flow upwards without check. Nothing is easier than taking down the shoots from time to time, as they become strong and well developed. Now this is a principle almost unknown, and certainly not practised in this country; being applicable to many forms of training, I can strongly recommend it, having frequently witnessed the good effects produced by carefully carrying it out.

Jardin Fleuriste



IN ITS public nurseries Paris possesses a very useful aid which we have not in England. With us each park or garden produces or purchases its own supplies; in Paris all the gardens of the city are furnished from its nurseries. It should be observed that in Paris there are two sets of public gardens—those of the city comprising the boulevards, squares, church gardens, and so on, and those of the State, the gardens of the Luxembourg, Tuileries, etc. All are equally open to the public—all arranged with a view to its pleasure and convenience; but in the case of the State gardens each supplies its own stock. What we have to deal with now is the manufactory, so to speak, for the vast array of gardens and open spaces made during recent years. At one time the old State gardens were by far the most important in Paris; now they are quite eclipsed by those created especially for the city and its people, and not merely as the surroundings of a palace or the pleasure-gardens of princes. Considering that the whole is of such recent growth, the success of the arrangements is surprising. In commencing to improve the town by means of public gardens, there can be no doubt that it was a wise step to begin with central nurseries or plant manufactories, from whence all those gardens could be supplied.

The advantage of having public nurseries of this kind to supply the parks, gardens, and squares of a great city are so great, that it is surprising they have not been already adopted with us. Not only could the necessary trees, shrubs, and flowers be procured much more cheaply, but a far greater selection of choice subjects would be at the disposal of the planters. By selecting ground favorable to each class of plants, shrubs, or trees, the whole of the subjects in that par-

ticular section would be grown to as great perfection as by any nurseryman—could be produced at a far cheaper rate than they could be bought; and the necessity of searching for, bargaining, and selecting would be done away with, the planter having merely to indicate the subjects required. They could be quickly despatched to any given point in vans constructed for the purpose. In addition to these advantages, a small portion of each nursery might be devoted to an experimental ground to test newly introduced or imperfectly known plants; and in this respect each would be of valuable aid, not only to the State, but also the general public. With our parks and crown lands in which to select positions, the establishment of such gardens would not be expensive, and would in a very few years save the first cost of their construction. Our large nurserymen would feel a pleasure in contributing their novelties and rarities, as they now do to our botanic gardens, and a system of exchange might be arranged between them to the advantage of both public, private, and commercial establishments.

The present system is too bad to last. We have, in and around London and our other great cities, numerous public parks and gardens, and it is to be hoped their number will go on increasing from year to year. Let us suppose that the superintendent or designer of a new public park or garden wants many thousand trees and shrubs for its embellishment. He has to obtain them wherever he can, and as the nurseries are arranged chiefly or solely for private use, most probably there will be great difficulty in getting some things even at a high rate. For example, a very important item in town gardening consists of trees for park and avenue planting. If at the present moment we wished to plant an avenue of trees, of suitable size and properly prepared for the purpose, we should no doubt have to send to the Continent for them, as in our own nurseries they are not prepared for street planting; in which case they would cost much more than if bought in this country, and be in far worse condition for the purpose than if they had been grown at home. The plants recently

placed on the Thames embankment have been imported from the Continent, and of course there would not have been the slightest occasion for this if we possessed the kind of establishment I suggest, and of which the necessity must be seen by every reader. In Paris there is a great central establishment at Passy where all the tender plants are grown and increased, and they are nurseries specially devoted to the production of city trees and shrubs, in which the most suitable kinds are grown, and grown exactly to the size and shape in which they are best suited for being placed on the boulevards, or in the parks or gardens. The cost of each plant or tree is in this case a mere trifle; in our own the plantation of even a very small park, or one boulevard, would amount to a very considerable sum. To pay a guinea apiece for specimens that we could produce for a few shillings, and a shilling or two each for common stuff that we could grow for a few pence, is to follow a plan whereby our public gardening, and consequently the health and beauty of our cities, are considerably retarded.

The Jardin Fleuriste of the city of Paris is situated in the Avenue d'Eylau, close to the Porte de la Muette, leading to the principal promenade of the Bois de Boulogne, and should be seen by every visitor interested either in public or private gardening. It is the depot for all the tender plants used in the decoration of the parks, gardens, and squares of the city. Entering from the Avenue d'Eylau, the first objects of interest that meet the eye are collections of handsome plants growing in the open air on a small lawn amidst the glass houses with which the place is nearly covered. My object is not to describe the garden in detail, but simply here as elsewhere to point out its most attractive features. To me the most interesting and valuable group planted on this lawn is a number of hardy Bamboos, proving clearly that in our latitudes we may enjoy the peculiar grace and verdure of these giant grasses, and by planting them highly improve the appearance of our gardens and pleasure grounds, especially in places under the mild influences of the sea and in the west and south of England and Ireland.

On the grass here during the past summer might be seen one of the most magnificent of all pea flowers, *Clianthus Dam-pieri*, flowering very freely in the open air, although we find it so difficult to grow even in our greenhouses. It was sown in February and planted out early in June as a tuft of several plants, isolated on the grass, but rooted in peat soil. The shoots grew to more than two feet in length, and began to unfold gorgeous blooms at their apex about the beginning of August, continuing to do so till the commencement of October. As an isolated group upon the grass, I need not say it was very fine; and I believe the same success could be obtained in mild parts of this country, and in many places against the low, warm walls of glass houses, etc. It should be raised as a greenhouse annual and planted out about the first week in June in peaty soil. Some may not be aware that it is infinitely more beautiful than the old and brilliant and popular *C. puniceus*, though, unlike that, difficult to cultivate and impatient under the most skillful treatment in houses. There are usually many fine groups of Yuccas, Musas, Cannas, various new plants, and other objects of interest in this little lawn which will well repay a careful examination. The most remarkable of the novelties of the past season was *Dimorphanthus manchuricus*, a remarkably handsome plant, reminding one of *Aralia japonica*. A plant of it a few inches high put out at Passy in July, 1868, had leaves a yard long and thirty-four inches across by the middle of September. It will prove of the highest value in the ornamental garden.

The first great group of glass houses are span-roofed. The interior arrangements made in them for the convenience of the workmen and for the preservation of the plants in winter are most admirable, and should be adopted by us in all similar instances. We build more hot-houses than any other people, construct them better, and furnish them better; and therefore it is desirable that in disposing them in relation to each other we should employ the most economical and convenient plan. Everybody knows how often they are scattered about without any connection with each other, and the consequent addi-

tional expense and trouble. But, even where the errors of the scattering system are guarded against, there is seldom an effective means of communicating from one to the other without going in the open air. We all know how disagreeable it is to pass from a moist stove to a frosty air—from wet gusts to damp greenhouses; it is dangerous to tender plants that often have to undergo it unclothed; nor can it be otherwise than injurious to the health of those employed in such structures. All these inconveniences are got rid of by the very simple plan adopted in the case of the group of houses. The plant houses diverge on each of a glass-covered passage, and there is no necessity for taking the plants into the open air in winter, or for the men who work in the houses to undergo any change of temperature for hours at a time. The houses are so closely arranged together, that heating them becomes much less difficult than when they are separated. The advantages of the plan are so great that I should strongly advise everybody building a batch of houses for growing or storing plants to adopt no other. For graperies with the borders outside it would not be so suitable; but where good borders are made inside it would answer well; or the vineries or peach-houses might form the outer four houses of each block, leaving the plant-houses, forcing-houses, etc., inside.

Plants may be grouped in the passage, where narrow, in half-oval groups between each door. In large places, where money is not an object, and where the houses on each side would be filled with very ornamental specimen plants, it would be a capital plan to make the central passage as wide as one of the houses. Beds may be placed between the doors, in winter garden fashion, and climbers run up the roof, thus covering the passage into a most agreeable promenade. With the better kinds of climbers depending from the roof; a few belts of Oranges and Camellias, and some palms and fine-leaved plants here and there, to lend the scene grace and character, I can fancy nothing more agreeable in the way of winter garden or conservatory, particularly as the varied contents of the houses on each side should be seen through the

glass ends and doors from the promenade. A wide gutter separates the roof of one house from that of its fellow—forming a passage along which men can freely move to arrange shading, ventilation, or repairs. It will be seen at a glance that easy communication between all parts of the range is secured, that the plants just rooted in the propagating house have merely to be carried across the passage to the house devoted to their future development. The plan is capable of adaptation in various ways, to houses either large or small.

One of the houses in the block just referred to is the largest and most perfect propagating house I have ever seen, being more than eighty feet long and twenty-four feet wide. From this house immense quantities of plants are turned out in the course of a year, many of them being large-leaved *Ficuses* and plants that are difficult to strike, as well as *Begonias*, bedding and free-rooting plants. It contains three central and two side beds; the central pits are well elevated, and every space is in active work, the whole presenting a most imposing array of large bell-glasses.

The propagating which seemed most successful, is carried out on a different plan to ours. No pans are used in this house, but very small pots, a shade larger than a thimble: in each a cutting is placed, the little pots are placed in the tan, and covered with large circular bell-glasses. The greater part of the house is occupied with these, all being of the same size. But there are some special arrangements for propagating the more difficult subjects, and among them may be noticed what appeared to be an improvement, the bell-glasses, which are somewhat of the ordinary shape, being provided with an aperture at the top of about two inches in diameter, into which a piece of sponge is squeezed to absorb the moisture from the inside. Nothing could be more business-like than the arrangements for propagating in this house. We will next glance at a few of the more remarkable collections and structures.

Imagine yourself prepared to visit a propagating establishment, and then finding yourself ushered into a grand conservatory of *Camellias*, a second being in connection with it filled

with *Aralias*, *Yuccas*, *Beaucarneas*, tree ferns, *Nicotianas*, *Dasyliirions*, *Dracaenas*, and a host of such plants, all in fine condition and well arranged; and another, on the other side, containing healthy palms in vast numbers. These are arranged in three longitudinal beds, while all along the sides of the house is a belt of the smaller and younger kinds, plunged in tan to give them a little encouragement. To look along the pathway between these long beds is like glancing into a fresh tropical palm grove, in such perfect health are the plants. When it is considered that many other great houses are in the garden, besides a large field of pits and frames, the reader will agree that it would be out of the question to examine each subject, particularly when it is stated that there are nearly 400 kinds of palms alone in this establishment. Though it is essentially a business garden, and one in which an almost innumerable host of plants have to be annually developed, no slovenliness of arrangement or culture is apparent in any part.

Seldom indeed do we see such efficient economy of space in gardens as is the rule in these houses. Under the benches are packed quantities of *Caladiums*, *Fuchsias*, *Cannas*, and other plants that may be efficiently preserved in such places in winter; and even after the great *Arums*, etc., are potted off in spring, they are placed underneath for a short time, every available inch being taken advantage of. Some of the houses are large lean-to's, and instead of the back wall being left naked, or with one shelf placed against it at the top, there is a series of shelves one above another, six altogether, and on these a multitude of plants are accommodated—*Coleuses*, etc., in the warm houses; *Lantanas*, and the like, in the cool. They keep well on these during the winter, and, if drawn a little or discolored, the mischief is soon counteracted by a sojourn of a few weeks in the frames in spring. In the large span-roof curvilinear houses, with a narrow passage through the center, there is a series of shelves affixed to irons on each side of the central pathway, and on these great numbers of plants, which is truly admirable. But doubtless it is necessary thus to economize space, for the enormous number of nearly three

million of plants is annually furnished by this establishment for the embellishment of Paris and its environs. They are raised at a very cheap rate—less than a penny each. It should be observed that many of the plants are such as would be fit to embellish any exhibition, numbers of them being palms and fine-leaved plants, while of course the least valuable are simple bedding plants, from *Nierembergias* to *Pelargoniums* of which last 400,000 plants are sent out annually.

If neither houses nor plants were seen, the potting-shed would tell of extraordinary operations, for in the center there is a great wide bench, around which sixty men can work. Ordinary bedding plants are kept here in an unusually economical manner. A large space of ground is covered by parallel lines of rough and rather shallow small wooden frames, simply and cheaply made—in fact such as the rudest workmen could put together during wet weather. The frames are rather closely placed; and the pathways between, and indeed all the spaces around them, are filled up with leaves and mossy rakings from the adjacent Bois de Boulogne. These are nearly or quite piled up to the edge of the frames, and of course keep the plants warm through the winter. In winter the floor of the frames is low; in spring, by putting in a quantity of the well consolidated leafy stuff before named, it is raised so as to bring the foliage of the plants right up to the glass. All the material is removed from between the frames in summer. Many of these frames are furnished with iron sashes, so that only the rough cheap framework is exposed to the decaying influences of the weather. The large quantity of leaves and moss thus decomposed is preserved for potting purposes, making of course excellent leaf-mold.

A number of houses that have lately been erected at La Muette materially encroach upon the space occupied by the rough framing just alluded to, which they are destined eventually to replace. These houses are especially intended for bedding plants, and are so well adapted for that end that some details about them may be useful. They have been designed on an excellent plan for the culture of such plants, the raising

of seedlings, and for the growth of seedling palms, and all dwarf and young plants. I have seen a good many houses devoted to similar purposes in public, private or commercial gardens in all parts of these islands, but never any so well-arranged as those in the Jardin Fleuriste. They are low, and rather narrow, so that all operations may be conducted from the central pathway. The sashes are cheaply made of thin iron, and the roof consists of one sash at each side. Many of the iron sashes of the old frames were utilized in the building of the houses.

As you pass along by the ends of these plant houses you may see a bench about a hundred feet long, filled completely with the deeply dyed *Alternantheras*, a sheet of color; the next devoted to young palms, as green and vigorous as if in their native wilds; another devoted to young *Dracaenas* and fine leaved plants generally; and so on. The benches are of slate, and the plants are held well up to the glass, while quantities of subjects in the way of *Cannas* and *Dahlias* may be stored beneath. We generally prefer wooden houses, but any horticulturist who has seen the plants in this low range at Passy will agree with me that no plants could be in finer health or condition; while the very permanent nature of the structure is a great gain, inasmuch as a wooden series of the same character would require a complete overhaul in the course of a dozen, and perhaps reconstruction at the end of twenty years.

A mode of protecting these houses from frost by means of wooden shutters, each about the size of the sash of the house, is deserving of notice. The shutters are not taken from between the houses every day, but simply left in piles of ten or so over some unoccupied spot, or if the range happens to be completely filled, each pile is shifted every day so as to prevent the plants beneath from suffering. The facility and simplicity with which these houses may, in a few minutes, be thus encased in wood to meet a very severe frost, and without the least untidiness of any kind, are admirable. However, matters are so arranged in the houses that they could dispense entirely with this precaution, which is noticed merely from its adaptability

to many places where a great number of bedding plants have to be kept, and where the means of heating sufficiently to keep out very severe frosts are not forthcoming. The ground plan of the range is nearly the same as that already described, so that the men at work in any of the eighteen houses of the block already completed, may pass and convoy plants from one to the other without passing through the open air. Thus the comfort of the men and the health of the plant are both secured. Already nine houses are arranged on each side of the central passage, and it is proposed to continue the arrangement till all the ground previously devoted to framing is covered with this class of house. The visitor, entering at the outer end and continuing his way through any of the houses, would at its further end meet with the covered way running at right angles to it, through which he could enter any of the other houses he wished to see without again exposing himself or opening any doors to chill the plants in winter, or running the draughty gauntlet, as he usually has to do where houses are arranged in the ordinary scattered way. Moreover, as in many cases, one long house is devoted to a particular species or variety in much request, the visitor or superintendents may see the state of the stock by simply traversing the central passage, and looking through the glass dividing it from the houses.

But though the ordinary dwarf bedding plants are preserved in vast quantities both in the rough frames and the houses, these are not the cheapest ways in which they manage such things here, as we shall presently see. Many have heard of the graceful use of the Cannas in Parisian gardening. These are preserved in a most efficient way in caves under the garden. When the stone is taken out of the ground for building purposes, a rough propping column is left here and there, and thus dark and spacious caves of equable temperature are left underground. They are in this case about seven feet high, and are used for storing plants that may be well preserved without light in the winter. You descend by a sloping tan-covered passage, and most likely you will imagine yourself in a large potato store immediately you get down, as heaps of different

kinds of Canna, and those that are by no means common with us, are in winter spread upon the floor a yard or more deep, and twenty feet long. The tubers of some of the large varieties are from five to ten inches long, and the men turn them over just as they would the contents of a series of potato-pits.

Here too in wide masses against the wall are arrayed quantities of *Aralia papyrifera*, the handsome and much grown species so useful for subtropical gardening. It seems in a perfectly firm and safe condition, growing in this dark or rather gas-lighted atmosphere, and sends out long blanched leaves of a delicate lemon colour, which will of course soon acquire a healthy green when the plants are placed in the open air. Thus they preserve *Aralia papyrifera* in all sizes, and this fine thing is turned out for garden embellishment almost as cheap as wall-flowers. Of course analogous protection could be given to such things in many English gardens where space may be limited, and much expense out of the question. In these caves were also preserved Brugmansias, American and other Agaves, Dahlias, Fuchsias, &c., and it seemed to me about the best possible place for storing such plants.

The quantities in which you see rare things and new bedding plants here are surprising. Houses, eighty and a hundred feet long, are filled with one variety; and others of equal size are devoted to the raising of seeding palms, &c., in large quantities. If a plant be considered worthy of attention at all it is propagated by the thousand; 30,000 being the opening quantity for a new thing of any promise. During the past autumn 50,000 cuttings of one kind of Fuchsia were inserted in one week. Dracaenas are grown here more abundantly than variegated Pelargoniums in many a large English bedding garden, and the Jardin Fleuriste is believed to possess the finest collection of them in existence. In one house a specimen of each kind has been recently planted out for trial in the central pit, and among them are many handsome kinds worthy of extensive use with us.

It is a favorite plan here to devote a house to a special subject. Thus there is a large and fine span-roofed stove for

Ficuses; a house for the collection of Bananas, with a line of thirty healthy plants of *Musa Ensete* forming its backbone, so to speak; a very large and high curvilinear stove for the great collection of Solanums; special houses for Arums, Caladiums &c., and a winter garden about 120 feet long by 40 wide, well stored with a healthy stock of the usual conservatory plants, with here and there fine-leaved things like *Phormium tenax*, a very effective plant when well grown in pots and tubs, and of which they have here thousands of plants of various sizes. Of course all this vast collection cannot be and is not used for summer decoration. It is employed for the decoration of the Hotel de Ville, where 10,000 plants are sometimes required upon a single occasion. The boilers of some of the smaller houses are heated by gas, and in this way a very equable temperature is preserved.

It may give some approximate idea of the collection, when it is stated that there are in cultivation nearly twenty species of Banana, about fifty kinds of *Aralia*, forty of *Anthurium*, fifteen of *Pothos*, thirty of *Philodendron*, nearly one hundred and twenty of *Canna*, eighteen of *Zamia*, and more than one hundred and ten of *Ficus*, while families better known and more popular are counted by hundreds!

Although the place is chiefly devoted to tender plants, and most of the dwarf hardy subjects are grown in the nursery in the Bois de Vincennes, there is, nevertheless, some interest taken in hardy plants, seeing that a part of the garden is devoted to one of the most extensive collections of Tulips in existence.

It is a regular practice in this and other new public gardens in France to plant out a sample of their stock of tender flower-garden plants each year for comparison. In the parks, squares, &c., they of course have opportunities of seeing how they thrive, but the object is to test them all growing on the one spot and under the same conditions. Thus, you see all the kinds of *Canna* planted out in one place, all the varieties of *Pelargonium* in another, and so on. It is a good practice, but it is needless to repeat it year after year to a large extent. If

you have thirty species of *Solanum* planted out for several seasons in succession, you must know all that you want to know respecting their comparative value, and the practice here of planting out every year old kinds time after time is useless. All that is necessary is to test the new additions, and in some cases it may be desirable to plant the old ones by them for comparison, but to plant out annually a vast collection from a well-known family is quite unnecessary.

Large, light, and well made spring vans are used for transporting the stock of flowers from the Jardin Fleuriste to the parks and gardens, and from one nursery to the other. They are about twelve feet long, and a little over six feet wide. By a simple arrangement each van is made to do the work of two—a second floor of strong shutters, hinged two and two together, being placed at the height of a foot above the lower floor of the van. The shorter plants are stowed underneath, those on the upper floor may be as tall as you like; but as the stock removed in this way usually consists of dwarf subjects, one serves as well as the other. By means of this plan 2000 plants, each in single pots, are removed at a time. The contrivance is merely such as common sense would suggest; yet for want of a little such common sense how much labour is wasted! How frequently, for example, do we see in country places two men attached to a handbarrow dragging about plants! Of course it is as unnecessary as it is laborious for the men. There is often more fuss and labour over transporting the summer flowers of a country place from the propagating houses to the flower-garden than occurs with the several millions of plants furnished yearly by the city of Paris, and all for the want of a few simply-contrived spring barrows. Not to adopt simple facilities of this kind in our public gardens is sheer mismanagement.

There are also vans of peculiar make for conveying ornamental plants to the Hotel de Ville. Those used in winter are furnished with a little stove with flat hot-water pipes passing round the interior, so that, while space is not curtailed, the van is efficiently heated, and tender plants can be conveyed by it in the depth of winter.

Students of all nations are admitted to this establishment. They must be eighteen years of age, and must have spent some time in practical horticulture. Their pay is sixty francs per month during the first three months, seventy during the second, and after that eighty or eighty-five francs per month, after which they are paid according to capacity and intelligence. They are changed from section to section of the establishment, so as to study with profit each kind of culture. An extensive botanical library has lately been added for the use of the officers and students of this establishment, and is now being catalogued and arranged. It contains nearly all the standard English books on horticulture; indeed quite half the books are English.

Attached to the Jardin Fleuriste are a forge, a carpenter's shop, a glazier's and painter's shop, stables, and other offices. These are of course indispensable where economy is necessary; and saving money is a consideration even for the city of Paris at present. The mode of glazing with several strips of lead-paper laid one over the other, as practised here, is too expensive to be recommended; it costs as much as the glass itself, and after all peels off after a time. It is known as the *couvre-joint métallique* of Celard, 16, Rue du Faubourg du Temple.

The Public Nurseries for Trees, Shrubs, and Hardy Flowers.—The nursery for trees for the boulevards is situated at Petit Bry, near Nogent-sur-Marne—a somewhat out-of-the-way place. The nearest railway station to the nursery is that of Nogent-sur-Marne, on the Strasbourg line. It consists of nearly forty-five acres, entirely devoted to the raising of the commoner and more useful kinds of trees for avenue and boulevard planting. On entering it the first peculiarity that strikes the visitor is, that the whole of the surface of the ground is thrown into ridges nearly six feet in width, on the apex of which the trees are planted. This arrangement is adopted in consequence of the ground being occasionally flooded by the river Marne, which is close by, and the trees being injured by the water being frozen above the base of their stems. But the necessity of taking this precaution resulted in an advan-

tage, as the trees being planted on the apex of these ridges, and with the collar of each, say, a foot above the level, make their roots much nearer home, so to speak, and thus their transplanting is rendered much more easy. When the time comes for removing them the workmen begin at one end and turn them out quite rapidly, all with close bundles of roots. The whole surface of the nursery is thus treated. The trees are a little more than a yard apart in the lines, which are, as may be inferred from what was before said, within a few inches of six feet from each other.

The kinds mostly used are the Western Plane, Horsechestnut, the large-leaved Elm, the *Ailanthus glandulosa*, Planeras, and Lombardy poplars—the last, however, are not used for avenue or street planting. Other kinds used on a smaller scale than these—the *Paulownia*, for example, are grown at Longchamps. These trees, the names of which are put down in the order of their importance, are all trained straight, and sent from hence to the boulevards for planting as far as possible of an equal size. The rule is to send them out with a clean stem nearly ten feet high, and about eight inches in circumference. The portion above the ten feet clear stem is not of so much consequence and may vary, but if the trees when taken up for planting do not present the length of clean stem considered necessary, the lower branches are cut away till it is attained. Of course the trees are so pruned when young that straightness of stem is obtained. To arrive at the necessary size and fitness the Plane requires five years, the Horsechestnut ten, the *Ailanthus* four, the Elm and *Planera* about five years each. The Elm and *Planera* are the only trees that require support in training them into the necessary form, for which purpose stakes from fifteen to eighteen feet high are used. The whole place is surrounded by a hedge of *Tamarix tetrandra*, which is cut down occasionally, and the shoots sent to the Jardin Fleuriste for stakes for house plants and the like. This nursery is well kept and managed, and has a large stock of street trees.

The nursery for shrubs is very pleasantly situated near the race course of Longchamps in the Bois de Boulogne, and is

somewhat more than twelve acres in extent. I found it in excellent keeping, and with a good stock both of well-known and rarely used subjects. Roses and all kinds of shrubs and hardy climbers are grown here, as well as nearly every description of low tree. The superintendent considered the Caucasian Laurel (*Cerasus caucasicus*) the hardiest and best of any he had tried. There were good stocks of those fine hardy Aralias—*spinosa* and *japonica*; they should be everywhere employed for the sake of their large and handsome leaves. A good many subjects were out for trial as to their hardiness, among them an extensive collection of Japanese plants. *Melia Azedarach* was in a healthy condition after passing a sharp winter in the open air. From this nursery all the shrubs of the various parks, squares, and gardens of the town are supplied.

The nursery for herbaceous plants is situated in the Bois de Vincennes, and consists of nearly twenty acres of sandy ground just outside the fortifications, near the Porte Picpus and Lac Daumesnil. There were here, at the time of my visit, five or six acres of Chrysanthemums, prepared for bedding in the various parks as soon as the frost had cleared them of their summer occupants. There were also large stocks of the flowers used to replace the Chrysanthemum and decorate the gardens in spring. The stock of spring flowers is an unvaried one, and leaves much to be desired. Where there is so much ground devoted to a specialty it ought to be well done; and it will be a pity if with so much improvement in other ways a large stock of all the really ornamental hardy flowers is not formed. The public gardens cannot fail to have a great influence on all visitors to Paris, and it would be conferring a very general benefit if, instead of depending so much on plants requiring expensive stoves and ceaseless trouble for their preservation, the chief gardeners of the city showed what may be done with the hardy plants belonging to our own and similar climates. At present their collections of herbaceous plants and spring flowers consist of quantities of common and not always first-class kinds. They have, for instance, very few Tritomas in the Vincennes Nursery, and none at all in the parks, though

they are perhaps the most useful and attractive of all autumn flowers. It is, however, only fair to state that the nursery stock was killed in the winter of 1867. But when groups of these plants are established in the parks or gardens there should be little difficulty in preserving them by placing leaves over the roots in winter.

The nursery for the Pines and Rhododendrons is also in the Bois de Boulogne, near Auteuil, occupying somewhere about the same space as the one previously described. The climate of Paris is not so favourable to the growth of coniferous trees as that of England, and consequently to the English visitor the Auteuil garden does not look so attractive as that at Longchamps, but it is well stocked, and serves its purpose admirably. The American plants are mostly grown in the slight shade afforded by thin hedges of *Arborvitae*. The ivy used for making the edgings, which are so much admired in Paris gardens, and for every other purpose for which the plant is employed, is grown here. Cuttings are first put in in handfuls, so close that the stems touch each other. After a year or so they are transferred singly into four or six-inch pots, and plunged below the rims into the sandy soil. They are used for forming the edgings at the age of two or three years. Galvanized wire is extensively used here for the purpose of supporting plants that are usually staked. Stretched tightly in parallel lines at about the height the line of plants requires it forms a neater, handier, and cheaper support than ordinary wooden stakes, which are so liable to decay and shake about.

Imperial Fruit and Forcing Gardens at Versailles



THE imperial fruit and forcing gardens at Versailles form a large establishment, not so costly nor nearly so fine as Frogmore, but containing a few things novel and instructive to the English visitor. Generally the crops do not display the high cultivation nor the surface the rapid rotation to be seen in the market gardens round Paris, but in the culture of hardy fruits there is something to admire. It is a forcing, culinary, and fruit garden solely, therefore there are few pot plants to be seen, the houses being nearly all devoted to the pine-apple. Some years ago the culture of this fruit was considered by some of our gardening authorities to be better understood in France than in England; but though very fine pines are grown in the neighborhood of Paris, our pine growers are on the whole the best. Dutch growers of the pine-apple as Mr. James Barnes of Bickton, Mr. David Thompson, Mr. Rose at Frogmore, and many other gardeners, afford us the best example of how to produce it in the highest degree of perfection. The forcing department is usually well-ordered and neat so far as the more permanent houses go. In them the back walls may be seen very prettily covered with the two well-known Vincas, *alba* and *rosea*. To cover the walls of all kinds of glass-houses devoted to ornamental purposes is an object with most people who possess such things. It is very rarely well accomplished, mostly from using a bad selection of vigorous growing plants, which often get covered with insect filth, and become a capital breeding place for it, or perhaps never yield flowers. If anybody possessing a stove, pine-house, or intermediate house, or any other warm structure with a back walk and border against it, will

plant in it and train against the wall the two pretty subjects named above, plant for plant, the result will prove strikingly pretty. The plants are always glossy and full of flower, may be kept at two feet or allowed to grow six feet high, and are always free from insects or vermin of any kind. They keep neatly to the wall with but little trouble, and bloom all over the surface, top as well as bottom. They are in this state very useful for cutting, and the effect, when you enter the house, is of the most pleasing kind. Their culture in this way is far more satisfactory than in pots, and in almost every warm stove or forcing house in France you see them trained against the back walls. The system of forcing grapes and early vegetables in very small rough frames is extensively practised here.

The fruit growing department is undergoing a gradual and complete alteration, especially as regards the choicer Pears, trained as espaliers. So satisfactory is the system adopted, that I am certain if English cultivators generally could get an idea of its excellence it would lead to a revolution in our fruit culture, and a great improvement in the appearance of our gardens. I know of no way whereby we may so highly improve the garden culture of the Pear than by paying more attention to it as an espalier tree. This is also the opinion of many of the best fruit growers in Britain, who agree that there is no finer fruit than that gathered from well-managed espalier trees. It is well known that some pears lose quality by being grown against walls. It is equally certain that a fuller degree of sun and exposure than the shoots and fruit get on a pyramidal tree is very desirable in many parts of this country, especially for particular kinds. Many sorts grow beautifully as pyramids; others, to be had in perfection, must be grown upon walls; but by means of the improved espalier system the majority of the finer kinds may be grown to the highest excellence. If the French can teach us nothing else they can certainly give us a lesson as to the improvement in appearance, cheapness, and utility of the espalier mode of growing fruit, especially as regards the finer varieties of Pear trees.

It should be borne in mind that the good opinion of espalier trees given by British cultivators has been won by them under great disadvantages, for nothing can be uglier or more inefficient than the usual mode of supporting and training espaliers in our gardens. It is generally so costly and disagreeable to the eye, that it has been done away with for these reasons alone in many gardens. I know some important ones near London, and indeed in many parts of Britain, where the espalier is the most unworkmanlike and discreditable affair to be seen in the place. Great rough uprights of wood, which soon rot and wobble out of position, thick and costly bolt-like wire, cumbrous and expensive construction, and, in a word, so many disadvantages as would suffice to prevent the prudent cultivator from attempting anything of the kind. The form of tree used, too, is such that the lower branches become impoverished, and often nearly useless.

To support his espalier fruit trees the Emperor's gardener, M. Hardy, has largely adopted a system which is at once cheap, neat, and almost everlasting. Instead of employing ugly and perishable wooden supports he erects uprights of T-iron, and connects these with slender galvanized wire. These are tightened with the little *raidisseurs* before alluded to, and then there is an end of all trouble. He manages to erect this trellising nine feet high for less than a shilling a yard run; but it could not be done so cheaply in smaller quantities. Then, instead of adopting the common form of espalier tree, with horizontal branches, he more frequently uses trees of which each branch ascends towards the top of the trellis, and thus secures an equable flow of sap through the tree. There is no more important matter connected with our fruit culture than this very point, and therefore I should be much obliged to all my readers, both amateur and professional, if they will give the subject attention, as I am sure that by doing so they will be led to largely adopt it, and much improve their fruit culture. The finest stores of pears I have ever seen were in gardens with a good length of tree trained in this manner; and I know few places in France where the espalier system is so extensively and

so well carried out as here. The form here represented is much better than a cordon or single-branched Pear tree, because a more free and natural development is allowed to the tree, and at the same time the trellis is covered quickly, and a considerable variety of fruit may be obtained from a small space. It is very extensively adopted by M. Hardy, upon walls as well as on the neat and elegant trellis, of which he has constructed so much. Of course the Palmette Verrier, the fan, or any other form, may be trained on these trellises, but decidedly the best are such as combine the advantages of quick covering and early productiveness claimed for the cordon, and the fuller development and more pleasing appearance of the larger forms. It should be borne in mind that planting erect cordons close together, as they must be planted, involves a great expense which is avoided by using trees of a fuller development. It takes a good many years to form the large style of tree usually adopted and therefore I advise the general planting of these intermediate forms.


Nothing can be neater alongside garden walks than lines such as these trained on the trellis alluded to. There is no shaking about of rough irons or wooden beams, no falling down or loosening of the wires; the fruit is firmly attached and safe from gales, the wood is fully exposed, and the trellis when well covered forms an elegant dividing line in a garden. The best way to place them is at from three to six feet from the edge of the walk, and if in the space between the espalier and the walk a line of the cordons elsewhere recommended be established, the effect and result will prove very good indeed. In some cases where large quantities of fruit are required, it may be desirable to run them across the squares at a distance of fifteen or eighteen feet apart. The principle is quite simple, the proof of which is that the trellises at Versailles were erected by the garden workmen. M. Hardy, the head gardener at Versailles, is the son of the celebrated writer on fruit trees of that name, and has had much experience in fruit growing. "These trellises," says he, "are the cheapest as well as the most ornamental that we have yet succeeded in making and

the trees which I plant against them are of the form that I prefer to all others, for promptly furnishing walls and trellises, and for yielding a great number of varieties in a comparatively restricted space." The mode of employing the uprights of pine wood painted green and reaching from the top of the trellis to within six inches of the ground, is not a common one, though very desirable where the erect way of training the shoots is practised. The reader will readily perceive that this system combines the advantages of the cordon and the large tree. Of course many other forms, or any form, may be used with this system of trellising, with slight modifications to suit different kinds of trees or different forms. The double trellis is simply a modification of the preceding, and is not only desirable where space is limited, but also for its economy, for one set of uprights supports the two sets of wires simply by using cross bits of iron about eighteen inches long, and at the desired distance apart.

The Pear as a low cordon is found to succeed very badly and to plant it as an oblique cordon at fifteen or eighteen inches apart is considered much too close and very unwise. A white wall fourteen feet high covered with Easter Beurré Pears was very fine indeed. The trees were mostly on the Quince stock, a few on the Pear, but all bore equally well. They were all trained in the five branched form usually adopted here, and had almost covered the tall white wall. The fruit-growing foreman insisted very strongly on the necessity of having white walls for fruit trees, and stated that dark ones injured both fruit and leaves, while white ones benefited both. White walls, apparently well lime-washed every year, are to be found in every good establishment, whether for peach, grape or other wall fruit culture. The Easter Beurré may be seen here double-worked on the Curé. On one wall the trees are established and in good bearing; on another they had been budded last year only. The Curé is first grafted on the Quince and allowed to form five vertical branches before it is budded. The Easter Beurré is found to do best when double-grafted, though the trees directly on the Quince and Pear seemed to do well.

The naked parts of the stems of fruit trees in this garden were in many cases protected from injury from a strong sun by being neatly covered with straight straw, tied with willow twigs. Neatly done, it seemed better than the commoner plan of placing slates or boards before them. Brackets to support straw mats in spring are placed on every wall at a little more than a yard apart.

There are a great many old and worn-out trees in the garden which have had a bad effect on its appearance here and there, but the gradual adoption of the new trellises will much improve matters. The Pear makes as strong a growth here as I have ever seen it make in Britain, though some of our growers are continually saying that quite a different and very much more fruitful kind of wood is formed in the fine climate of France. There are a few specimens of forming letters with trees to be seen here, as in many other French gardens.

When I last visited this garden M. Hardy had commenced carrying out a system of protecting his espalier trees. The plan is simply to strain lines of galvanized wire above the top of the espalier, so as to form a low span when covered with rough canvas. The sides are not covered, but the protection at the top is sufficient to prevent radiation, and to throw off heavy rains when the trees are in bloom. If there is a wall running at right angles with the lines of espaliers, wires are stretched from it so as to form a light support over each espalier; if not, a post is driven in so as to support and stretch the wire in the firmest way. The lower of these two lines  may be supposed to represent the top of the espalier, the upper a line firmly supported at a few inches above it. Wires are also stretched at each side of this, at about twenty inches from it, so as to form the outline of a very low span-roof of strained wire. It is a matter of little difficulty to stretch cheap canvas of some kind over these wires, letting it be an inch or two narrower than the breadth between the outer wires, so that it may be strained tight, say a yard for the canvas, and two inches more for the wires. The outer margins must of course be firmly threaded to the outer wires with

twine or any convenient tying or rough sewing material. Here they simply use the stems of the glaucous or Hard Rush (*Juncus glaucus*) which grows wild all over Britain, and find it answers admirably. A neat ridge is then arranged over each line of espaliers, which throws off the rain and prevents radiation, thereby saving the bloom from frost and insuring a crop. The protection is put up before the buds are liable to be injured, and removed when the fruit is set, and all danger has passed away. Thus a very cheap and effective protection is secured. The old trellising used for fruit growing in these gardens is inferior compared to the new. The kinds of pears mostly grown here are Easter Beurré, by which several walls are covered; Duchesse d'Angoulême, of which there is a square of trellising in all nearly 600 yards long, and about nine feet high; Beurré Diel, and Louise Bonne d'Avranches.

The Peach is well-grown and trained in some parts of the garden, a form with five main branches being adopted with success. It is analogous to the form used for the pear in the same garden, and is very readily made.

In addition to the trellises above described, the most remarkable feature of this garden is the presence of a vast number of horizontal cordon Apple trees, both in single lines and in superimposed ones of two or three stages, all on galvanized wire. The trees are on the Paradise stock, and nearly always confined to a single stem. These trees bore an enormous crop during the year 1868, but the fine apples were nearly all destroyed by the worm. At the end of September, the display of fruit was quite remarkable, although much had fallen before that period, and the year had been too hot for the perfect development of the Apple. One border devoted to cordons is 300 mètres (984 feet) long, and altogether there is 4000 mètres of cordon apples in the garden. As the greater portion of this length is composed of two and three lines of wires placed at distances of a foot one above the other, there is really quite 8000 mètres, or more than five miles of horizontal (or French) cordon Apple trees on the true Paradise stock, and the plantations are being extended as often as circumstances will permit.

It should be observed that though the cordons are often grown in lines one above the other, one plant does not furnish more than one line except at the ends. There, however, it is necessary to take several branches from one plant to furnish the two or three lines of wire starting from the same post. Here, as in many other gardens superintended by experienced fruit growers, this mode of Apple growing is preferred to any other, but the enormous number planted best speaks of the estimation in which it is held. The cordons, though generally well-managed, are not quite so good as I have seen them elsewhere, and apparently from being too closely confined to the main stem. I have always noticed them best and most satisfactory when allowed to form a free and regular bush of spurs along the stem. The soil is as cold, stiff, and disagreeable for fruit culture as could well be devoted to that purpose.

The New School of Fruit Culture of the City of Paris in the Bois de Vincennes

Not long since it was determined to make a new school of fruit culture for Paris, and in the spring of 1868 the first trees were planted. Naturally there is but very little to be seen as yet; but, nevertheless, a description of it can scarcely fail to be of use. As to plan and arrangement it is almost identical with that recommended by M. Du Breuil for the north of France. It is situated near the Avenue Daumesnil entrance to the Bois de Vincennes. The first thing remarkable about the new garden is its walls; they are of felt, supported on a rough wooden framework. The felt is first nailed on frames of wood about six feet long by four feet wide, which are dropped into a groove made in the uprights, the stronger framework being based upon a few inches of masonry; the felt is whitened over, and the whole surmounted by a little ridgelike coping. This peculiar form of wall was erected in consequence of the objection of the authorities to have any walls of solid materials in the neighbourhood, which is so near the fort, but this merely helped to prove that in cold northern countries we may hope to grow good fruit by

means of something less expensive than well-made brick walls. These walls are about nine feet high, except at the north end, where they are more than twelve feet high.

The garden, which is not a yard larger than is necessary for the purpose to which it is devoted, is in two divisions—one to illustrate the practical and profitable culture of fruit for market, the other all the important modes of fruit culture, the various curious and useful forms of wall and standard trees, and, in a word, most things necessary to know concerning the subject. The division devoted to illustrate the mode of culture best calculated to afford a quick and certain return is planted almost entirely with the finest of all winter Pears, Easter Beurré, and that well-known Apple the Calville Blanc, one of the best of all Apples for either dessert or culinary uses. The Pears are all cordons, either planted against walls or espaliers, and the Apples are all the low horizontal cordon, the form I have so often recommended. The most valuable and excellent fruits are the only ones cultivated. Most of the cordons against the walls are oblique (thus ///), except at the high end wall, where they are vertical. The Professor's reason for adopting this form, is that the walls are more readily covered by it, and a much quicker return obtained; and of course he thinks these advantages compensate for the expense of planting so closely, or any other objection that may be urged against the system. Between three and four thousand trees of Easter Beurré, and the same number of Calville Blanc, are planted here in this small garden. The trees have done very poorly indeed, having been planted too late, and it is to be feared many of them will die, so that much in the way of healthy and fertile specimens will not be seen for some years.

One thing cannot fail to strike the British visitor who takes an interest in fruit growing, and to give him a valuable lesson at the same time; precautions to protect the trees effectually from wet and frost are taken, which are never seen or thought of in British gardens. All round the walls iron brackets project from immediately beneath the permanent wooden coping, to receive wide copings made of felt on a cheap wooden frame-

work, in lengths about six feet long and two wide. These are slipped in under the short permanent coping, and rest on the bracket, the hooked point of which holds them in position. A small eye is at the under side of each, so as to thoroughly fix the coping by attaching each length with a piece of wire to another eye near the upper portion of the wall. Thus a most effective and excellent protection is afforded the delicate blossoms and fruit in spring. This is against the walls, where the British cultivator occasionally, takes a little trouble to protect his trees from the cold rains and frosts of the budding and flowering season. Equal care is taken to protect the espalier trees—a thing which has never yet been attempted by British fruit growers, who, however, are not slow to contrast the difficulties they have to contend against with those of the French, for whom of course the climate is said to favor everything. The protection for the espaliers is afforded by iron rods projecting from the top of the pine posts that are used to support the double espaliers, and running through them are six lines of galvanized wire, forming a sort of span over the trees. A little above these wires runs a stronger one, connecting the posts beneath it, and resting on the lower wires are two lines of neat thin frames of straw, each at least a yard wide. These are firmly fixed down to the wires, so that in spring the trees are placed under what may be called a neatly-thatched shed. No doubt some other material would look better than the straw, but it is cheap, and when nailed firmly between laths does not look untidy; and, moreover, it is the object of the place to show the cheapest as well as the best methods of protection, and also the best way of applying those most commonly in use; and the use of neat straw mats for protecting walls is very common in France. Posts of pine wood five or six inches in diameter are employed to support the espaliers, because they are cheap; and, to secure their durability, they are thoroughly saturated with blue vitriol before being erected. This is a cumbrous and bad plan, the kind of fruit trellises employed at Versailles being neater, more durable, and in every way so superior that I am astonished

that anybody who has seen the Versailles trellises could think of erecting such things as these.

In the garden devoted to teaching purposes, all the lines which the branches of the wall trees are to pursue when fully formed are indicated by small rattan canes—accurately placed, so that as the tree grows the trainer has no hesitation as to the exact position each branch should take, but merely has to attach to the rods so definitely laid down. The larger trees against the walls are mostly those I have figured as the *Palmette Verrier* (see Page 488). This is however occasionally trained “double,” that is, it has two vertical stems instead of one. Useless as well as desirable forms are shown; for instance, trees formed like a goblet, with the branches crossed or ascending vertically, or sometimes like a goblet reversed. These are all useless for practical purposes, though they may serve to amuse an amateur; who, however, would do better to amuse himself with trees more beautiful, productive, and easy to train. The way of making a hedge of Pears—a hedge that when once made, and with its branches crossed and intertwined, will support itself—is also shown; and without doubt neat and productive screens may thus be made in any garden, and the trees kept quite as neatly as if supported by expensive trellising.

Asparagus Culture



SPARAGUS is grown much more abundantly and to a much larger size in France than it is in England. The country is half covered with it in some places near Paris; small and large farmers grow it abundantly, cottagers grow it—everybody grows it, and everybody eats it. Near Paris it is chiefly grown in the valley of Montmorency and at Argenteuil, and it is cultivated extensively for market in other places. About Argenteuil 3000 persons are employed in the culture of Asparagus—at least so I was told by the son of the cultivator who took the best prizes for Asparagus at the Exhibition. His father not being at home, I traversed a considerable portion of what may be termed the region of Asparagus with this youth, who was of the intelligent type, and understood all about this dainty vegetable. I first saw it growing to a large extent among the vines. The vine under field culture, I need scarcely say, is simply cut down to near the old stool every year, and allowed to make a few growths, which are tied erect to a stake; they do not overtop the Asparagus in anyway, but on the other hand the strong plants of that show well above the vines. It was not in distinct close lines among the vines, but widely and irregularly separated, say six or seven feet apart in the rows, and as much or more the other way. They simply put one plant in each open spot, and give it every chance of forming a capital specimen, and this it generally does. When the stems get large and a little top-heavy in early summer, a string is put round all, so as to hold them slightly together (the careful cultivator uses a stake), and the mutual support thus given prevents the plant from being cut off in its prime. We all know how apt it is to be twisted off at the collar by strong winds, especially in wet weather, when the drops on every

tiny leaf make the foliage heavy. The growing of *Asparagus* among the vines is a very usual mode, and a vast space is thus covered with it about here. But it is grown in other and more special ways, though not one like our way of growing it, which is decidedly much inferior to the French method.

Perhaps the simplest and most worthy of adoption is to grow it in shallow trenches. I have seen extensive plantings that looked much as a Celery ground does soon after being planted, the young *Asparagus* plants being in a shallow trench, and a little ridge of soil being thrown up between the lines of *Asparagus*. These trenches are generally about four feet apart, sometimes less. The soil is rather a stiff sandy loam with calcareous matter in some parts, but I do not think the soil has all to do with the peculiar excellence of the vegetable, and am certain that soils on which it would flourish equally well are far from uncommon in England. It is the careful attention to the wants of the plant that produces such a good result. Here, for instance, is a young plantation planted in March, and from the little ridges of soil between the shallow trenches they have just dug a crop of small early Potatoes. Now, in England the *Asparagus* would be left to the free action of the breeze, but the French cultivators—like the old Scotch-woman who would not trust the stormy water and God's goodness as long as there was a bridge in Stirling—never leave a young plant of *Asparagus* to the wind's mercy whilst they can get hold of a bit of oak about a yard long. But when staking these young plants they do not insert the support close at the bottom, as we are too apt to do in other instances, but at a little distance off, so as to avoid the possibility of injuring a fibre; each stake leans over its plant at an angle of 45 degrees, and when the sapling is big enough to touch it or be caught by the wind, they tie it to the stick as a matter of course. The ground in which this system is pursued being entirely devoted to *Asparagus*, the stools are placed very much closer together than they are when grown among the vines, say at a distance of about a yard apart. The little trenches are about a foot wide and eight inches below the level of the ground—looking deeper, however, from the soil being piled up.

The young plants are placed in these trenches very carefully. A little mound is made with the hand in each spot where a plant is to be placed so as to elevate the crown a little and permit of the spreading out of the roots in a perfectly safe manner. In fact they seem to be about as particular as regards depositing the young plants in the first instance, as a good grape-grower is about his young vines. They plant in March and April—using any kind of manure that can be had, but chiefly here, so far as I could see, the refuse of the town—the ashes, old vegetables, rags, and other matters, that the people throw before their doors, and which the dust-carts take away in the morning. They are very particular to destroy the weeds, and they also take good care to destroy all sorts of insect enemies in the mornings, especially during the early summer. Between the lines of *Asparagus* they plant small growing crops on the little ridges during the first years of the plantation, but are careful not to put large vegetables there, which would shade and otherwise injure the plant. When they plant they spread a handful or so of well-rotted manure over each root, and they repeat this every year, removing the soil very carefully in the autumn down to the roots, putting on them a couple of handfuls of rotten manure, and spreading the earth over again, so that the rain is continually washing nutriment to the roots. When doing this they notice the state of the young roots, and any spot in which one has perished, or has done little good, they mark with a stick, to replace it the following March. Early every spring they pile up a little heap of fine earth over each crown. When the plantation arrives at its third year they increase the size of the little mound, or, in other words, a heap of finely pulverized earth is placed over the stool, from which some, but not much, *Asparagus* is cut the same year, taking care to leave the weak plants and those which have replaced others, to themselves for another year.

They would appear to cut the best of it when it is about an inch and half out of the ground—and here is the only objectionable thing about their system. The top is very good, but

as a rule too short; but such a handle as they give you to it! Now, it may be desirable to have something to take hold of, but to cut it as they do here, and as we often do in England is not wise, or conducive to the thorough enjoyment of the vegetable. However, it is simply a matter of the amount of covering given, or of the depth at which it is cut, and therefore of the simplest management. The care and culture may be applied as described, and the Asparagus cut at pleasure. To procure it in a thoroughly blanched condition, the French pile up these little mounds of fine earth, which enables them of course to get it much longer; besides, they can pull away the soil conveniently, and get at the rising stems as low down as they like. It is not, however, the fault of the cultivator that the Asparagus is so much blanched, for I have been told by the first fruit and vegetable merchant in Paris that his customers would not buy the finest Asparagus ever grown if brought in a green state. This is why you see it with a shaft like ivory and with the point of the shoot of a red, rose, or violet tinge. Then again, some contend that Asparagus blanched after the French fashion is far more delicious than when it is eaten in the green state, while others in England say it is worthless. From what I know of the arguments, however, it is clear that those who say French Asparagus is worthless, mostly know it from some old bundles bought and eaten perhaps a fortnight after they were cut in France. Let us hear the French side:—"In certain localities they do not yet value the distinction between blanched and green Asparagus, and occasionally prefer the latter. This is an error very prejudicial to the consumer's interests. In the green Asparagus there is only the point edible; in the white it is often entirely so, and, moreover, it is infinitely more tender and delicate. All Asparagus cut when it is green is not fit to be eaten in the ordinary way, but may be used cut up small as an accompaniment to other dishes. To serve up green Asparagus is to dishonour the table! In the markets of Paris the green Asparagus is worth three francs; they do not eat it (the green Asparagus)—it serves for the manufacture of syrup of Asparagus."—V. F. Leboeuf.

When the plantation reaches its fourth year the little mound of blanching earth is increased to fifteen inches in height, for then they expect to cut something worth while, and these mounds are made in the early part of March; and even after this, as they grow stronger the little mounds are increased; and they always keep a look-out for the feeble plants, with a view to replace them. To have *Asparagus* as it ought to be they say you must cut every day, or every two days, according to temperature, so that it may be obtained at the right moment; indeed if they do not do this, the shoots become too high and too green. They place great importance on obtaining strong and healthy plants; and in the establishment which I visited they have three kinds, *l'Ordinaire*, *La Hollande*, improved, and *La Hâtive d'Argenteuil*. The first is described as very fine, the second very strong, and the last as the earliest, most productive and best. Of course there are various modifications of the plan described herein, and in several instances I saw two rows placed in a rather wide trench in an alternate manner. As to the size and quality of the *Asparagus* produced by this method there can be but one opinion. Mr. Veitch and many other English horticulturists, who know what gardening is, as well as it is possible to know it, have been, with myself, surprised at it. The same difference holds good in the forced *Asparagus*—the slender pipe-shank productions of the English forcing-house being miserable compared to it.

Concisely: the French mode of cultivating this delicious vegetable differs from our own diametrically in giving each plant abundant room to develop into a large healthy specimen, in paying thoughtful attention to the plants at all times, and in planting in a hollow instead of a raised bed, so that as the roots grow up they may have annual dressings of enriching manure. They do not, as we do, go to great expense in forming a mass of the richest soil far beneath the roots, but rather give it at the surface, which is consistent with the nature of the root. And in this way they beat us with *Asparagus* as thoroughly as Messrs. Meredith, Henderson, or Miller, beat them with hothouse grapes. A man who knows how to spend

two and a half francs for his dinner in Paris enjoys Asparagus for a longer time and of much better quality than many a nobleman in England with a bevy of gardeners. In the first-class restaurants you usually pay high for Asparagus, as you do for all other vegetables, but it is served very cheaply in many respectable ones—so much so, indeed, that it is partaken of by all classes.

As the culture of this vegetable is so important, and the French manage it so well, I venture to go further into detail by giving the following account, written by a well-known and very successful cultivator of Argenteuil, and first published in the *Gardener's Chronicle*. I have made some few alterations, with a view to rendering the meaning simpler and clearer to the reader.

“PREPARATION OF THE GROUND. When a convenient piece of ground has been selected, it is first of all to be mellowed by spreading on its surface a good dressing of horse or sheep manure. The ground is to be dug up to a depth of sixteen inches in fine weather at the beginning of winter, during which season it is to be left at rest. In the month of February following—at least, as soon as severe frost is no longer to be expected—the ground is to be laid out in furrows and ridges, in order to shape shelving beds, and the excavations which are to receive the plantations. For this purpose the following operations are to be performed. First, there are to be drawn the whole length of the ground, and by preference from north to south, two lines, leaving between them a space of fourteen inches, intended for the site of the first half-shelving bed. Reckoning from the interior base of this half-shelving bed, a distance of twenty-four inches is to be measured for the first trench. The earth taken from it will serve to form the shelving bed. The second shelving bed, which will be a large one, is to measure twenty-eight inches in width at its base, and fourteen inches in height. Next comes the second trench, then the third entire shelving bed, and so on, until the whole piece of ground has been occupied. Thus, the first half-shelving bed will measure in width fourteen inches, and in height

eight inches; the first trench in width twenty-four inches, the second entire shelving bed in width twenty-eight inches, and in height fourteen inches. The earth of the shelving beds being intended to cover over the plants from time to time, these beds will gradually diminish in height, and the whole piece of ground will become nearly level at the end of five years, when the *Asparagus* plantation will be in full productiveness."

"FIRST YEAR. The first plantation is to take place during the months of March or April, and should be performed in the following manner:—In each trench, through its entire length, small holes, eight inches in diameter and about four inches deep, must be formed about thirty-six inches distant from each other. In the centre of each of them a small hillock of earth about two inches high to be raised, upon which the *Asparagus* plant is to be laid down, care being taken to divide the roots equally in every direction; the roots are then to be covered over with half an inch of earth; and one or two handfuls of very good manure are to be added, and covered over with about an inch and a half of earth, at the same time forming a small hollow of about an inch deep over each plant, to indicate its position. In order exactly to know the position of the plants, and to shelter them and their shoots from accidents, a small stake is to be set to each, inclining it at an angle of 45 degrees, in order not to injure the roots; and placing it a little away from the plant.

"Every morning, towards the months of April and May, slugs and snails are to be carefully looked for and destroyed. Beetles are also much to be feared in the *Asparagus* plantations. Twice every day during a fortnight it will be well to pursue these insects with rods, so as to hinder them from depositing their eggs on the stalks of the *Asparagus*; these eggs develop at the end of three weeks into black maggots or worms, which prey upon the *Asparagus* stems and dry them up. Yet these insects are not the only ones which are to be dreaded. The white worms (or maggots of tree beetles) are very dangerous, and it will be well constantly to put in use the most proper means to get rid of them, for they eat the

roots and destroy the plants. It will be useful also to set mole traps, for while tracing their underground roads the moles cut the roots. Frequently during the season the plantations should be thoroughly cleaned, taking care to never bruise or in any way injure the young plants, for any accident to these is of course directly prejudicial.

“Common vegetables, such as late Potatoes, Cabbages, &c., ought not to be planted on the ridges of beds, which, however, may be made useful (but only during the first years) by growing on them early Potatoes, Lentils, Kidney Beans, Salads, and such other vegetables as are of little inconvenience from their dimensions. In the month of October, during fine and dry weather, the small stalks of the Asparagus are to be cut off at six inches above the ground. The ground is to be lightly cleaned, and the shelving beds must be dug up to a depth of twelve inches, maintaining their conical shape. The Asparagus is to be lightly covered with manure, the plants being laid bare with a flat hoe, for a diameter of eight inches, and up to the crowns. Proper care ought to be taken not to injure the roots with the implement. On each plant lay one or two handfuls of good manure, free from all noxious substances. While spreading the manure, mark out with a small stick the site of the plants which have failed during the course of the year; these must be renewed in the month of March following. The manure is at once to be covered over with about three inches of the best mellow earth at hand, and over the plants is to be made a small conical hillock about two inches high. This operation is the last to be performed for the year.

“SECOND YEAR. In March or April begin by replacing the plants which have failed in the preceding year, selecting vigorous plants a year old, and setting them in the same manner as recommended for the first year. Stakes are to be placed near the foot of each plant, always at an angle of 45 degrees. In the beginning of April a cleaning is to be made on the shelving beds and on the grounds; it will be well to perform this operation the day after a sprinkling of rain, in order the more

easily to break the clods. As soon as the *Asparagus* stems become firm, fasten them to the stakes, in order to protect them against the wind, which might break them, In the month of October the dry stalks are to be cut off at eight inches above the ground; the shelving beds are to be turned up, always lightly hollowing out the trenches. Manure is to be spread on the shelving beds, which are then to be dug up. The stakes, having become useless, are to be taken away. Lastly, the laying bare of the roots is to be done by taking away the earth, as always directed, the dressing of decomposed manure placed over them, and lastly, the manure is in its turn covered with a couple of inches of the finely pulverized soil.

“THIRD YEAR. In the middle of the month of March, during fine weather, small knolls, from six to eight inches high, are to be made over each plant, taking nevertheless as a basis the comparative strength of the crowns, more or less large, or of a more or less determined development; those which may be too feeble, or having served the preceding year to supply the bad ones, or those which had failed, are to be covered over with a hillock of only four inches high, and should then be left to themselves. From the other plants, three, or at most four *Asparagus* heads may be gathered; but they are not to be cut off with an *Asparagus* knife, but removed with the fingers. However, there is a particular sort of knife, square-shaped at the end, and having teeth on one side, forming a saw, which will be useful to take away the earth about the stalk, and will make it easy for the fingers to reach the subterranean stock, which care must be taken not to injure. With regard to the gathering, one finger must be got behind the *Asparagus* stem at its base, and by bending it, it will easily come off the stock. In this manner all injury to its neighbours, which may easily happen with an *Asparagus* knife, will be avoided; and there will not be left any wounded ends, from which the sap will flow and spread around, occasioning rapid decay. Care should be taken to close up the hole made for the gathering of the *Asparagus*, and the knoll is at once to be formed anew.

In the month of April, the stakes are to be again used, and the stems fastened to them in due time. After having, in fine weather, done all that is necessary in the way of cleaning, in the month of October the dry stalks are to be cut off about ten inches above the ground, and the dead rubbish thrown out of the Asparagus plantation. From the whole surface of the trenches, and to a depth of four inches, the earth is to be taken away and thrown upon the ridges, this earth is to be substituted by a layer of very good manure, which layer is to be of a thickness of about an inch and a half, if night soil is made use of, or of about two inches if it is only common manure. At the same time a portion of the end of the old stalks is to be taken away, preserving that nearest to the crown, so as to indicate the exact site of the plants for the fourth year. After having spread the manure, the ridges must be dug up, and the manure covered with an inch or two of earth from them, a small hillock being left over the crown of each plant.

“FOURTH YEAR. About the middle of March, in dry weather, or the day after a sprinkling of rain, knolls of the height of from ten to twelve inches must be formed over each plant with the fine earth from the sides of the ridges. The feeble plants marked with a small stick at the preceding laying bare, are to be covered over with hillocks of a thickness of from four to six inches only. While earthing up the Asparagus the ends of the dry stalks are to be taken away. The gathering is to take place from the largest specimens during one month at the most. Then they are to be left to run to seed. The most feeble ones are to be spared in order to strengthen them. At the second dressing in the month of May, earth is taken from the shelving beds, in order to cover over, to an extent of an inch or two, the whole surface of the grounds, so as to protect the Asparagus plantation from the dryness of the summer. The stakes should be five feet high. In the month of October the stalks of the Asparagus are to be cut off at fourteen inches above the ground, and the plantation is to be cleared of the rubbish; manure is to be spread on the ridges, which are to be made up from the knolls in the trenches; and

are then to be dug up to a depth of sixteen inches. Notwithstanding the manure laid upon the shelving beds, the roots of the *Asparagus* are to be laid carefully bare in the manner already described. Upon the crowns are to be put a few handfuls of good manure, which is to be covered over with two inches of good mellow earth; the little knolls which are to be formed over the centre of the plants, are to be over three inches in height.

"FIFTH YEAR. The making of hillocks on the *Asparagus* is to begin in the month of March; they are to be fourteen inches high, and their diameter is to be in conformity with the diameter of each specimen or 'stool.' The gathering is to consist of the heads on all the large plants, and of some only on the feeble ones; the gathering may last two months at most. In order to get fine *Asparagus*, the heads are to be gathered once every day, or every other day, or every third day at farthest, according to the degree of temperature. This is the way to obtain rosy, red, or violet *Asparagus*. In order to get it green it will be sufficient to let the heads grow during four or five days more; they will lengthen and become green. The second dressing is to be made as in the preceding years. The stakes are to be put in as soon as the necessity is felt, and the stems, having regard to the increase of their height and weight, must be firmly tied, so that the wind may not disturb them and that they may not be broken. In the month of October following, the dry stalks are to be cut off at fourteen inches above the ground. The plantation is to be cleared, and the ridges are to be replenished by adding to them the earth of the knolls which have been raised on the plants for the gathering. Then the manure is to be spread in the manner already indicated; and the digging up of the ridges is next to take place.

"SIXTH YEAR. When the *Asparagus* plantation shall have reached its sixth year, it will then be in full productiveness. The forming of knolls is to take place in March during fine and dry weather; the knolls must always be fourteen inches high, reckoning from the subterranean stock. The care to be taken

is to be the same as in the preceding years, particularly with regard to cleanliness and staking. As for insects, they will be less to be feared than during the first years of the establishment of the plantation. The beetles can no longer lay their eggs on the stalks, since they are cut during two months, and when allowed to start up the time of the laying of eggs is past. In the month of October the shelving beds are to be turned up in conformity with the manner shown for the preceding year; the shelving beds and the plants are to be manured, as has been explained for the fourth year. As the Asparagus plantation may last fifteen or twenty years, the operations and the care to be taken are to be repeated from year to year in the manner above indicated. Generally, in a well established Asparagus plantation, the gathering, reckoning from its beginning, is to take place during two months, whatever may be the climatic circumstances under which the plantation is placed. It must have been seen that the expense is not very great; the chief object is the care which must be taken. The main point is to get good plants, in order to obtain good produce. By properly following the rules laid down here, satisfactory results will be obtained."

The mode of forcing Asparagus chiefly consists in digging deep trenches between beds planted for the purpose, covering the beds with the soil and with frames, filling in the trenches between the beds with stable manure, and protecting the frames with straw mats and litter to keep in the heat. In the beginning of November the pathways between the beds of Asparagus are dug up about two feet deep, and as much wide. Divide the soil coming from the pathway very carefully, and put about eight inches thick of it on the surface of the bed. Fill up the trench with good new horse-dung, and place frames on the bed. The manure should rise as high as the top of the frames, and the lights be entirely covered with mats and litter to prevent the heat accumulated in the frame from escaping. About a fortnight or three weeks after, the Asparagus begins to show itself on the surface of the bed. Many market gardeners cover the whole of the bed inside of the frame to a thick-

ness of three or four inches with dung to force more quickly the vegetation, but in this case the manure must be removed when the *Asparagus* begins to shoot. When the shoots are about three inches out of the ground they may be cut. The mats must be taken off in the daytime, but the heat must be well kept up or the roots and buds will fail to push. The beds are forced every second year only. The gathering of the *Asparagus* may continue for about two months, but no longer, or the plantation would be injured. When the gathering of the *Asparagus* is over, the frames and dung linings are taken away, and the soil which has been dug up from the alleys is put back again.

The preceding note applies to the forcing of the better qualities of *Asparagus* chiefly. I visited last September a place at Clichy in which quite a specialty is made of forcing the smaller sized *Asparagus*. It is the garden of M. Caucannier, Place de l'Eglise, and contains a number of iron houses, just on the same plan as those in the Jardin Fleuriste, already described. Indeed, if I mistake not, those in the Fleuriste are copied from them. There are frames with each house, just as in many propagating houses in England, and beneath them the *Asparagus* is forced for the markets, and in incredible quantities. The houses are heated by hot water, and the culture in other respects resembles that which is practised in forcing gardens in England—that is, when the plants are taken up to be forced indoors or in pits. The disturbance weakens the roots a good deal, and by this method the large table *Asparagus* is never forced. M. Caucannier and other growers produce it specially in a small state for cookery.

Vegetables of the Paris Markets



VISIT to the markets of Paris is sufficient to interest many in the vegetable culture of that capital. There is so much difference in the supplies to that market and the London one that there is certainly much to be learnt on both sides. That so great a difference should exist in the supplies of cities so near each other is somewhat remarkable. The Parisians make as much use of that delicate, wholesome, and excellent vegetable Sea kale as we in England do of the Bread Fruit Tree; and the Briton who leaves London in a hot and dry July, having failed to get a tender vegetable or salad at dinner, arrives in Paris next morning, and finds the streets in the neighbourhood thickly strewn with every variety as tender as if the climate were a perpetual May.

But, although abundant intercourse has long existed between the two countries, the fact that the observers are rarely practical men, and therefore not capable of seeing differences and their value and causes, and the difficulty of getting information about the subjects, noticeable improvements have not been exchanged from side to side. Therefore, in addition to dealing with the subjects in which the French are far ahead of us—Salads, Asparagus, and Mushrooms, for example—I have thought it well to speak of any varieties of vegetables with which we should be better acquainted, or which are likely to prove useful, and to add a few remarks about the culture of any of them where desirable. In this I simply do the best I can for the time, and believe the subject is far from being exhausted. My acquaintance with it only began in 1867. To save trouble in inquiries, I add that, should any reader find difficulties in getting seeds of any subject mentioned in

this book true to name he may be certain of getting them of the best quality from MM. Vilmorin, Andrieux, and Co., of the Quai de la Mègisserie, or of MM. Courtois-Gérard and Pavard, Rue du Pont Neuf, Paris.

OBSERVATIONS ON SOME OF THE VEGETABLES OF THE PARIS MARKET.

The Cardoon is much more grown and eaten in France than in England, and its culture is well understood. The variety most grown and usually considered the best is the Cardon de Tours (a spiny var). A spineless variety, Cardon Plein Inerme, and preferable on account of not being fiercely armed with spines. The Artichoke (*Cynara scolymus*) is grown to a very much larger extent in France than in England, and its culture is said to be attended with much profit. It is used in every Parisian restaurant. The variety considered the best is the Gros Vert de Laon. Camus de Bretagne is the kind that is often used raw. Of Asparagus most people agree in considering that of Argenteuil the best, though of the distinction between the several varieties there is little certainty. Of Beetroots, there is nothing to surpass our English varieties; the best French one is the Longue. It is cultivated to a large extent at Les Vertus, near St. Denis, and brought to market cooked, so that the smallest portions may be sold with salad. It is used much more than with us by the poorer classes, especially with Barbe de Capucin in the winter.

The little Carrot which is grown to such unvarying perfection is the Rouge Courte a Chassis. This and the so-called choice varieties of Carrots are far from being always obtained true. Cultivated as it is in Paris it is infinitely preferable to the larger and coarser sorts grown with us, but the difference is chiefly owing to the mode of growing it. The best salads known are grown in the vicinity of Paris, and among them the various Endives assume a great importance. Chicorée Fine d'Eté and C. Rouennaise are the best summer kinds; C. de Meaux is the larger one, used in a cooked state as we use

Spinach; and *C. de la Passion* is a very large variety, passing through the winter well without protection. The *Scarolle* for winter or autumn salad is really a noble kind of *Endive*, with smooth leaves, a vigorous constitution, fine flavour, and every good quality that such a plant should possess; and yet it is not at all sufficiently known or grown with us. The best kind is the *Ronde* or *Verte*, but the *Blonde* is also good. Of the wild *Chicory* there is an improved variety, *Chicorée améliorée* which forms little heads four inches or so in diameter in early spring, and is then very acceptable in a salad-loving country. By putting a *cloche* over stools of this variety, these little heads may be had all the winter. To blanch them slightly is an improvement, but this variety must on no account be employed to yield the *Barbe*, that popular Parisian winter salad. That is simply the common *Chicory*. It is grown in vast quantities near Paris, and prepared for use chiefly in caves at Montreuil—Montreuil of the Peaches.

Of *Lettuce*, as of *Endives*, the best known are found in and sent from the Paris market. The earliest is the *Crepe*, or *Petite Noire* and the *Gotte* or *Gau*; a fine variety for summer use is the *Blonde d'Été*; the *Palatine* or *Laitue Rousse* is also a most tender and delicate variety, keeps long, and is worthy of general cultivation; and the *Latue de la Passion* is an excellent winter kind, that may be grown without a *cloche* through the winter. In summer and autumn the *Grosse grise* or *Brune paresseuse* is also an excellent variety, forming a good heart. Of the *Cos* lettuces, the *Verte Maraîchère* is the one so largely grown and exported for spring use, and the *Blonde Maraîchère* is the summer kind preferred and grown by the market gardeners. The *Radish* of the Paris markets has lately been sent out by English houses under the name of *French breakfast Radish*. The French name of the best variety of this is *Rose Demi-long à bout blanc*. The earliest *Potato* is the *Mariolin*, the source of an important culture on the slopes of the hills above the *Bois de Boulogne*. It is kept all the winter in the light, and yet free from frost, so that when planted in spring marketable tubers are quickly produced, and the ground

when cleared of early Potatoes is fit for Haricots in May. Good King Henry (*Chenopodium Bonus-Henricus*), a really good and delicate herb, is used to some extent in private gardens, but does not form a product of the markets. Arroche or Orach, both of the red and white varieties, is much grown in private gardens.

Of Chervil there are quantities grown which to us seem incredible. It is much used in salad. One seed house alone sells about 1000 lb. weight of seed of it per annum. Bulbous Chervil is an excellent vegetable not found in the markets, but which ought to be grown in all private gardens. Such leguminous plants as have curious snail-like seed vessels are occasionally grown under the name of Chenillettes, to decorate salads and form imitation snails. They are of no importance, and with us are rarely seen out of botanic gardens, and not often in them.

The Ciboule, or Welsh Onion, is grown in quantity for salad. Tarragon is grown in great quantity for use in vinegar, and also in a lesser degree for salads. The Giraumon Turban Gourd (or Potiron Bonnet Turc) is much used where the Potiron would be too large. Salsify and Scorzonera are both grown in much larger quantities than with us. Of Corn Salad, so very important an article in the winter salad consumption of Paris, the Mâche Ronde or Doucette is the very best variety for autumn and winter, and the Mâche Régence d'Italie for spring use. With Cucumbers we are far ahead; with Melons we go into quite opposite grooves. The English Melons would not find buyers in the Paris market, nor probably would the French in ours. They are eaten in quite different ways in the two countries—in France with pepper and salt; and some people, for whom the rich flavour of the English Melons is too much, can enjoy those of the Paris restaurants. The large kind grown by all the Paris market gardeners is M. Cantaloup, Precott Fond Blanc. Of the long Turnips, or Navets, the long Hâtive des Vertus and de Croissy are the best varieties. Small Onions are largely used with Peas, the kind preferred being the Blanc Hâtive, sown in

August—this is a good kind. Of their keeping Onions, *Jaune des Vertus* is considered the best. *Sorrel* is of importance in the Paris markets, being largely used somewhat as we use Spinach. The variety preferred is the *Large de Belleville*. Of the Dandelion there is an improved variety, good for winter use, like the improved Chicory; the common kind is very largely used.

The *Potiron Gros Jaune* is the enormous gourd of which the finest specimen is annually crowned in the market, and is the source of some amusement. It is sometimes grown about 200 lb. in weight, and last year a specimen was in the market which reached 250 lb. It is largely used by the poorer classes for making soup in winter.

In Peas and in Cabbages we are in advance of the French. It may, however, be worth noting that a superior and very hardy variety of the *Choux de Milan*—the *Gros des Vertus*—is grown to a vast extent in the neighbourhood of Pontoise, and sent to the Paris market in March and April.

Brussels Sprouts are grown to a vast extent near Paris, especially about Rosny and Noisy. The variety is the ordinary one. They are used in much greater quantities than with us.

The Cauliflower is cultivated to great perfection around Paris, the varieties used being the *Petit Hâtif* or *Petit Salomon* for earliest use; the *Demi-dur* or *Gros Salomon* for summer; and the *Lenormand* for autumn. Brocoli is not grown by the Paris market gardeners, the market being supplied with Cauliflowers from Brittany in spring.

It need scarcely be said that Haricots are grown and used in France to a degree of which we can have but a poor conception. They are used every day in winter, in the smallest as well as the grandest restaurants in Paris; the earliest is the *Nain Hâtive de Hollande*. The one which supplies the quantities of ordinary Haricot is the *Flageolet Ordinaire*, or *de Laon*. The *Bagnolet*, or *Susse Gris*, is excellent for using green, and for making conserves, and is largely grown for these purposes; and the *Beurré*, or *Haricot d'Alger Noir*, is the excellent *mange-tout*, which is not at all known with us. The pod is

quite tender, of a yellowish white, and it is allowed to become larger than those of fully grown Scarlet Runners, and then cooked entire. This vegetable is both distinct and good, and deserves universal cultivation in the British Isles. A new variety, called *H. Cosse violette*, with violet pods, is also very tender and of good flavour.

CULTURE OF THE SMALL CARROT OF THE PARIS MARKET.

Every visitor to the Halles of Paris or the streets near them during the earlier hours of the day, must have noticed vast quantities of pretty, dwarf, tender little Carrots. They are always fresh, always to be had, and never contain a particle of the tissue which makes the coarser Carrots so much less valuable. Even when we do grow the best varieties of dwarf Carrots in this country, they never present the cleanly appearance of those of the Paris market gardens, nor are they so tender and good; the following article, therefore, on cultivating them both out of doors and in frames, by M. Courtois-Gérard, of Paris, may prove useful to admirers of this vegetable in its most perfect condition. Practically, and in a few words, the success of the Paris gardeners with the small Carrot results from sowing it, both in frames and in the open air, on very rich friable ground—the surface for a couple of inches being purely decomposed stable manure, and from giving it abundance of water whenever it requires it—thus securing quick unchecked growth and tenderness of texture. However, we will let this experienced cultivator speak for himself:—

“The common Carrot has produced several varieties, but the early or Dutch red, introduced into France about 1800, the Demi-long, and the *Rouge Courte à Chassis*, are the chief kinds grown in the market gardens of Paris.

“CULTURE IN FRAMES. At the beginning of December, a hotbed is prepared of fifteen or sixteen inches in thickness, the heat being allowed to rise to from 65 degrees to 80 degrees Fahr. The frames are next placed in position, and filled with manure rotted into the state of mould, mixed with earth to the depth of six inches. By using this soil we obtain Carrots

of a brighter red and better quality than when grown in garden mould only. When the heat has reached a genial point the seed is sown, and seven rows of the *Petite Noire Lettuce* are generally pricked into each frame. But although by this method we get two crops from the same frame, we do not think that there is much advantage to be gained from it, for it is not certain whether the Lettuces produced compensate for the harm that they do to the Carrots. These Lettuces are fit to cut in January. After they have been gathered, a little mould is spread over the place they occupied, and if the weather is dry the Carrots are given a slight watering. In the course of January, when the crop has grown up, the linings of the frames are turned over and raised as high as the top of the frame, so as to increase the heat of the bed. At the beginning of January, a second crop of Carrots is generally sown, but in this case a less amount of heat is required, and a sowing of Radishes is substituted for the Lettuces. When proper pains have been taken, the first Carrots may be gathered in the first fortnight of April. If the weather is fine during the latter half of the month of March, and the frames that cover the Carrots are required for other subjects, they may be taken off, in which case the Carrots may be gathered later. In February and March Carrots are again sown on heat, but in the open air. After this period straw mats are sufficient to preserve the sowings from the frost. These Carrots succeed those which were sown in December and January, and prepare for those sown in the open air. After the Carrots sown in February and March are gathered, Radishes are sown, and after they are gathered, turnip-rooted Celery.

“**SOWING IN THE OPEN AIR.** The first sowings in the open air are made in September. In the eastern districts they sow large quantities at this period. From the commencement of the earliest frosts care is taken to cover the sowings with litter, which is taken up whenever the weather is fine enough. When this sowing is successful, the Carrots may be gathered towards the month of May. Other sowings are made in February and March, from which time they may be continued regularly

until July. But at whatever time the sowing takes place, the ground ought to be well prepared, and the seed sown broadcast, in the proportion of about nine pounds to every acre. After the seed is sown the ground is slightly covered, and then trodden down with the feet, after which a layer of fine and thoroughly rotted manure is spread over the whole; the ground is then raked lightly, and watered whenever it is necessary. As soon as the young plants make their appearance, the crop, which is generally too thick, is carefully thinned out. Three months after the time of sowing, the more forward Carrots may be gathered, the results of the latter sowings being left until November. When the Carrots are gathered, the neck of each is cut, and the roots are prepared, after which they are covered with long litter, or else placed in a house for storing, so as to have a ready supply during the winter. In the case of light and fertile soils they need not be pulled up, as it will be only necessary to cover up the Carrot beds, so as to be able to gather them when wanted. The market gardeners of Meaux preserve their early Carrots by digging trenches in the autumn three feet wide, two feet six inches in depth, in which they place their Carrots, and cover them with straw during the frosty weather. In this way they are able to keep them until the end of February or beginning of March, which is the time at which they begin to sell."

THE CARDOON. The Cardoon, being a plant of very vigorous habit, must be grown in the best and richest soil of the garden, and well watered frequently. If it is sown in April and if not watered abundantly many of the plants will go to seed during the summer, for which reason it is better to defer the sowing of it until May, when it may be performed either in the open ground or in a seed bed. It is better to adopt the former method, as the Cardoon having a very smooth, fibreless, conical root is ill adapted for transplanting. Those, however, who prefer the latter method may sow it in a seed bed and plant it out when old enough. In a well-dug bed about seven feet wide, two furrows are traced at a distance of about four feet from each other. Marks are made along these

furrows three feet apart, and three or four seeds planted at each spot thus indicated. If the soil renders it necessary a spadeful of earth may be removed and replaced by well rotted manure, and the seeds sown about an inch deep. The seeds should be sown in quincunx fashion. If the weather is dry and warm, the seeds should be well watered, and they will strike in a few days. As soon as the little plants are above the ground, the weakest should be carefully removed.

Those who prefer sowing in a seed bed should wait till the plants are four or five inches in height and then transplant them into the open ground with great care, the little root being already pretty long. The earth round them should be well pressed down and watered, and the plants shaded until they have again rooted. As it is not until the month of August that the Cardoon begins to be vigorous, crops of salads may be sown and gathered in the meantime. It cannot be repeated too often that the finest Caradoons can only be obtained by frequent and copious watering, the dose being increased as they grow larger. If the weather is warm and dry, at least a wateringpotful of water should be given to each plant every other day. In the month of September the blanching process is commenced, and this is done quite a different way to that practised in this country. The plants are simply tied up rather closely, and then a lot of long litter placed round each in a close tidy way, the straw or long litter being tied by small bands of the same material. The longest leaves of the head are left free above this blanching material. But the Cardoon is so fiercely armed that it requires a little care to get at the great plants to tie them up, &c., without being severely pricked. To obviate this three sticks are used—one of them short and connected with the other two by strong twine. The workman standing at a safe distance pushes the two handles under the plant, and then going to the other side and seizing them, soon gathers up the fiercely armed leaves. Another workman then ties it up in three places, and then the straw is placed around so as to quite exclude the light, and also tied up like Cardoon itself. In three weeks the vegetable is as well blanched and

as tender as could be desired. To blanch the Cardoon properly and render the leaves perfectly tender, it should be deprived of light and air for at least three weeks. It is then cut just below the surface of the earth, and divested of its straw covering; the withered leaves are sliced off and the root trimmed up neatly. If it is desirable to preserve the Cardoon for winter use it should be simply tied up, as before directed, in the month of November, and, uprooted carefully with a ball of earth attached to it, and plunged in fine rotten manure or leaf-mould in a dark cellar. The decayed leaves should be removed every week or so. Under this treatment they become sufficiently blanched in a fortnight, and may be preserved in a good condition for at least two months.

FORCING THE CAULIFLOWER. The best Cauliflower forced around Paris is the *Petit Salomon*. It is sown in the open air during the first ten days of September on very rich, light, and fine earth. When the young plants are well up—that is to say, commence to show the first two leaves—they are pricked out into shallow frames, surfaced with a couple of inches of thoroughly rotten manure. They are very particular about transplanting them when very young, and before they are drawn, watering before moving the young plants, so that they may be removed with the least possible mutilation of the roots, and they are pricked in with the finger at about three inches one from the other. At the end of November the plants are strong and hardy, but they must not be allowed to grow too quick, and therefore they are again transplanted, leaving a little more space between them. This second transplanting is to prevent the too rapid growth of the plant, and to enable it better to resist the cold. So long as it does not freeze, it is better to leave the plants exposed to the air. When it does freeze they are protected as much as need be, opening the frames, so that the plants may enjoy the sun, and taking care to protect them carefully with straw mats at night, sometimes surrounding the sides with litter to prevent the entrance of cold in that direction. In February these Cauliflowers are planted on gentle hotbeds from which Lettuces

have been cut. Between the Cauliflower plants are placed the Lettuce known as the Gotte and the Petit, and Gros Salomon Cauliflowers are planted alternately, so as to insure a succession. Other kinds of vegetables are placed between by some, but the Laitue Gotte is considered the best and most profitable for this purpose. Gradually as the season advances more air is given to the plants, and when they get too near the glass the frames are elevated by placing stiff wads of straw under their corners. About the beginning of April, if the weather be fine, the frames are removed, that they may be used in the culture of Melons. In case of late frosts, an arrangement is made to give some protection by means of straw mats. About the 10th or 12th of April the hearts are seen forming in the Petit Salomon, and eight days afterwards in the Gros Salomon. Thence forward the Cauliflowers are visited every two days, and when the heart of one is seen formed as big as a hen's egg, some leaves of the lower part of the plant are broken and laid upon it, so that it may be deprived of light and thus kept perfectly white. When these leaves wither or shrivel they are taken off, a fresh one put over the heart, and then the old ones laid on top. They are thus regularly watched, blanched, and cut when at perfection.

THE SWEET POTATO. Louis XV., it is said, was exceedingly fond of this vegetable, and had it grown for his table in the gardens of the Trianon and Choisy-le-Roi. From his day until about the year 1800 the Sweet Potato was relegated to hot-houses and botanic gardens, but about the last named period M. le Comte Lelieur, who was appointed manager of the royal gardens, had some grown at St. Cloud. The Sweet Potato soon became fashionable once more, and the many market gardeners of the day grew the vegetable largely. Later its cultivation was again abandoned for the sake of more profitable plants, and at the present time MM. Découfflé and Gontier are the only persons who pay any attention to it.

Instead of stopping to inquire into the modifications that the cultivation of the Sweet Potato has undergone, we will confine ourselves to saying that at present three varieties

are cultivated—the red, the yellow, and the New Orleans violet. They are all grown in hotbeds, and they are propagated in the following manner:—At the beginning of January a few tubercles are selected from those which appear to be the best preserved, and planted in a hotbed, the frame of which must be covered with mats during the night. In the course of a short time they begin to grow, and the young buds must be taken off when they reach the height of from two and a half inches to three and a half inches; they are then pricked into pots of about two and a half inches in diameter, which are plunged in heat and covered with a bell-glass, after which they may be watered as they require. As soon as the young plants strike, an event that soon takes place, the bell-glass must be lifted gradually until they are strong enough to dispense with it altogether without dropping.

Such readers as care about this root—which, by the way, is of agreeable flavour when well cooked—may grow it most readily and effectively by placing it in a frame or pit after the spring crop has been taken out; or, indeed, on a ridge like the ridge Cucumber; but the pit or frame is the safest way generally—the lights being taken off. As pits and frames are frequently empty from about the 1st of June till autumn, room might be readily spared for it without loss, and a useful vegetable added to our stock, which, fine as it is, is yet in want of variety. The roots may be bought in Covent-garden. The red variety is the best. The way to treat them is to pot them about the end of April; start then in a gentle heat, and have them fresh and stubby for planting out in the pit or frame about the first of June. They would be better for the lights for a few days. In this way they will be found to do better than when grown in a stove, and probably prove a more grateful vegetable than the Chinese yam in its best state.

EARLY POTATOES. The supply of early Potatoes for the market is an important branch of industry about Paris, a considerable portion of the slopes of the hill sides to the north of St. Cloud being devoted to it. I only speak of the subject here to point out that the cultivators commonly allow the

Potatoes to sprout vigourously indoors before planting them out, and thus secure crops so early as to have them out on the ground in time to put in summer crops. Some of the houses of the cultivators are stored with Potatoes freely exposed to the light in winter. It matters little where they are placed, provided they enjoy plenty of light and are kept perfectly free from frost. The usual plan is to have a room fitted up with rough shelves, and placing the Potatoes in the old oyster and fruit baskets of the markets, store them on the shelves till ready to plant out. Or the shelves may be dispensed with, and rough wooden trays used instead. These may be piled one above another, and may be quickly made out of old boards by the commonest workmen.

Only one layer of tubers should be placed in each basket or box. The variety used is a Kidney Potato, the *Marjolin*: the roots are in preparation as described so early as November, and are planted out in February, the crop being gathered in May and June. There is no need to warm the place they are in, except indeed to keep the frost from getting in, as the tubercles get on very well without it. In case they show signs of weakness, the windows of the house should be opened whenever the state of the weather allows it to be done without danger. Planted with all the pains necessary for the preservation of the young shoots, Potatoes treated in this way come to perfection much sooner than those which are planted without any previous preparation; indeed all the gardeners who supply the Paris markets with early Potatoes prepare their seed in the way we have described above.

OLEANDER CULTURE. Visitors to the Continent in the summer months can hardly fail to be struck with the employment of certain plants for decorative purposes, of which we in this country make comparatively little use. Here, if a few Orange trees or Portugal Laurels, perchance a Pomegranate, are grown in tubs and put on the terrace in summer time, it seems to be considered that enough has been done in that way. There is no reason, however, why many other plants should not be used in the same manner. Some may remember

the beautiful effect produced on a quay fronting the lake of Lucerne by a number of standards of this kind, including not only the plants mentioned, but Pittosporums, Yellow Jasamines, Evergreen Oaks, Euonymus, Aucubas, and Figs. At Vienna a similar assortment may be seen in front of some of the principal cafes, where one may sit in the open street under the shadow of the Pomegranate and the Oleander.

The latter plant, too, is an immense favourite with the Parisians. In fact, the Oleander forms, with the Myrtle and the Pomegranate, one of the most important articles of Parisian commercial horticulture. The reasons for this are obvious—the elegant habit, glossy foliage, profusion of bright rosy or white flowers, endowed, moreover, with an agreeable almond-like perfume, offer recommendations hardly to be exceeded by those of other plants. The culture, moreover, is easy. Indifferent as to the treatment it receives in winter, it may be kept in cellars or garrets—almost anywhere, in fact; hence its frequency abroad in the windows of the artisan and at the doors of the merchant's office. The shrub may be propagated either by layers or by cuttings; but of late years, in France, the former method has been abandoned, as it is found that cuttings produce plants of better habit, and in greater numbers. In this country the Oleander is rarely seen in perfection, and most probably because it is generally grown indoors. The treatment given it on the Continent insured the plant a perfect rest in winter; as it cannot grow in the cellars, caves, and dark orangeries in which it is placed. Therefore, when put in the open air, the accumulated growing power of the plant pushes forth equably and immediately; the shoots, being produced in the open air, are perfectly indifferent to any changes they may have to undergo therein, and the plants enjoy the full sun and uninterrupted light.

It may be noticed in two different conditions about Paris—in the large specimen form in tubs of various sizes, and as small neat plants in six-inch pots. These last are sold in great numbers in the markets, and flower as abundantly as the best managed of the large specimens. The finest examples of

large specimens I have ever seen are those in the garden of the Luxembourg Palace, and I have much pleasure in giving the following account of their cultivation by Monsieur Rivière fils, son of the talented and excellent superintendent of the Luxembourg Gardens. "Judging by the habit of the Oleander, as generally seen with us, it might be supposed that it would not make an ornamental tree for a terrace, but nothing can be finer than the immense specimens seen in Luxembourg Gardens, the heads being as round and dense as a Pelargonium grown by Mr. Turner, and sometimes as much as ten feet through; and as for the little plants grown in six-inch pots, nothing can be prettier. They are certainly far handsomer objects than Orange trees, grow equally well or better in tubs, and are more worthy of culture in this way.

This beautiful shrub is a native of Algeria and the south of Europe. In a state of nature, it prefers damp and fresh soil: it is consequently found in abundance on the banks of rivers and the edges of marshes. In the wild state it rarely reaches the height of more than from three to five feet, but under cultivation it may grow even to nine or ten feet. Its flowers are of a delicate rose colour, and from seed horticulturists have succeeded in obtaining yellow, white, and double-flowering varieties, which form some of the most beautiful ornaments of our gardens. This plant contains abundance of sap, which is very poisonous, and consequently very dangerous; it is therefore advisable never to put any of the flowers in the mouth, and to take care that no children should be allowed near the plants. The hotter the district in which the plant is grown, the more poisonous is the sap.

"The Oleander puts forth its flower-bearing branches a year in advance, and then blossoms for two consecutive years, so it is as well not to cut them down in the autumns after the first time of flowering. The beautiful specimens so much admired in the Gardens of the Luxembourg during the fine weather are from sixty to one hundred years old. They are grown in tubs three or four feet square, and in a compost made in the following proportions; half soil and cow-dung, a

quarter rotten stable manure; a quarter turfy heath mould; the whole being well mixed at the time the tubs are filled. The operation of re-potting should be performed every five years, about the month of May. The sides of the tubs being moveable, the earth is taken away from the roots of the tree, which is itself lifted up about three inches, so as to remove the soil all round it. This being done, broken flower-pots, or similar substances, are thrown into the bottoms of the tubs for the purpose of drainage, as is usually done with large shrubs planted in this manner. The shrub is then lowered into its former place, and covered up with the mixture just described.

"The Oleander is generally placed out of doors about the 10th of May, and as this plant grows naturally under a burning sky, it is advisable to give it as much sun as possible. A few days after it is put out, the surface of the soil in the tubs should be covered with cow-dung, and during the whole of the summer season they should be copiously watered at least three times a week. As soon as October comes, the waterings are diminished, and all the dung that is not entirely decomposed is taken away, the surface of the soil being stirred up with a pointed stick to make it more friable. The Oleander being extremely sensitive to cold, the plants should be taken under cover once more about the 15th of October, where they must remain until the 10th of May, during which time they ought not to be watered more than three or four times every month. In France the Oleander tree is attacked by a parasite called the *Chermes nerii*, which does it a great deal of injury. While in the greenhouse no pains should be spared to deliver it from its enemy by means of a stiff dry bush. The mischief caused by this insect will often kill the tree; prompt means must therefore be taken to free the trees from this pest as soon as it makes its appearance. If, in spite of all your care, the *Chermes* still keeps up its depredations, you must not hesitate to prune out all the old wood that is attacked. By this means the evil may be entirely remedied, a new set of shoots appearing and bearing flowers the following year."

The preceding details refer exclusively to the treatment of the larger specimens. The pretty little free-blooming Oleanthers are grown about Paris in pots, five or six inches in diameter, in sandy soil, and these pots they very soon fill with roots. They are plunged all the summer in the open ground, and grown at all other seasons near the glass in those low houses so much in vogue in Parisian nurseries and gardens. They flower profusely, and receive the same treatment as Orange trees, as regards housing in winter. They are allowed to rise with an undivided stem for about four inches, and then break off into several branches. There should be no difficulty in growing them wherever there is a sunny shelf in the greenhouse, by securing a clean, while discouraging a soft or luxuriant growth, giving them a rather dry rest in winter, and abundant water and light in summer. In winter any cool house will do to store them, or even a shed.

CULTURE OF THE ORANGE. In the following account of the cultivation of the Orange by Mr. H. Jamin fils, the son of the most successful cultivator of it in Paris, it will be clearly seen why and how we fail, and why a person with an old coach-house or any other rough structure with a few sashes or windows on its north side may grow handsomer Orange trees than those with the fairest of conservatories. It should be understood that it refers to the culture of Orange trees for placing in the open air in summer, and not with a view of growing them for the sake of their fruit. Where fruit is required from Orange trees in the country an entirely different system must be pursued, and there are signs that before long all the finer Oranges will be abundantly grown under glass with us.

"The Orange is propagated by grafting on the stock raised from seeds of *Citrus Medica* (the Common Lemon), or from those raised from seeds of the Common Bitter Orange. For the trade, plants grafted on the lemon stock are the most suitable, the Lemon growing more vigorously than the wild Orange tree; but to secure the plant long life, the latter is the most preferable. The reason of this will be easily understood; the difference between the Lemon and the Orange is much the

same as between the Quince and the wild Pear: like the Quince, the Lemon makes all its roots at the surface of the soil, the wild Orange goes deeper, and consequently the tree is better able to resist the wind and the vicissitudes of the season; naturally there is more analogy between the two woods, and the result of experiments is that the plants live much longer. An Orange tree grafted on the Lemon may live about a hundred years; after that time it decays and perishes; an Orange grafted on its wild congener may live over 300 years—witness the Grand Bourbon in the Orangery at Versailles, near Paris, which tree is now more than 400 years old, and is grafted on the wild Orange.

Sow the seeds early in the spring in a light but not too sandy soil, and in pots (twenty-five to thirty per pot); put the pots upon a dung-bed (lukewarm), and keep the soil fresh, but do not have any steam in the frame, and to prevent this give a little air. When the seeds have come up, encourage them to grow to three or four inches high. Afterwards put them in a warmer bed, and keep a damp warm atmosphere in the frame; shade them against the burning rays of the sun; and when they are seven or eight inches high, give them a little air, increasing it as they get stronger. Let them pass through the winter in a greenhouse, where the temperature must not descend lower than 4 degrees Fahrenheit, and in early summer put them on another hotbed in the open air plunged in leaf mould or cocoa fibre. Leave them plunged on this hotbed through the summer, and give them plenty of water, and from time to time a little liquid manure.

About the end of August in the same year graft them by the same method as that prescribed for Roses in the winter, and put them on a hotbed, keeping as much damp vapour about them as possible. Shade them during the sunshine, cover at night, and keep them close as long as the grafts are not well united together; they will be safe long before the early frost. Keep them in the frame during the winter, and the next spring divide and pot them in rich light soil mixed with a very little silver sand to prevent the soil becoming hard; put the pots on

a hotbed in a frame, and after they are rooted give them plenty of air. In the middle of June, make a hotbed in the garden and put them on it without covering whatever, giving plenty of water during the hot weather, and three or four waterings of liquid manure to encourage active growth. Before the first frost they must be housed, and they will do through the winter in a greenhouse where the temperature is kept three or four degrees over the freezing point.

During the spring of the following year pot the plants afresh, and place them on a hotbed covered with a frame; keep it close until the roots begin to shoot, and give air carefully; shading the frame against the burning rays of the sun, and when frosts are no longer to be feared, taking the lights off entirely. When they have done their growth, and the wood is sufficiently ripened, pot them afresh, and leave them in a greenhouse for a week or two. In June make a hotbed in the open air, covered five or six inches with dung-mould or cocoa refuse, and put them in it. This is the last season during which the Orange need be grown upon a hot dung-bed. The greatest obstacle to the success of the Orange as a terrace-plant is the persistence of the gardeners and nurserymen in treating it as a greenhouse subject. I do not mean to say the Orange should be treated like common shrubs, but it is possible, with very little care, to grow them in England almost as well as in northern France.

Many writers on this subject give the south exposures as the best for an orangery, and therein is the mistake. To insure the success of Oranges grown in boxes or in pots, they must not in any case be allowed to grow in the houses; all their growth must be made out of doors. It is a matter of fact, that if the orangery is to the south, no matter what the trouble you take to prevent their starting, the plants will begin to shoot a long time before the weather is mild enough to permit of their being placed in the garden. A good orangery should have a northern exposure, with plenty of windows to admit the light, and every convenience to give full air when it is not frosty. It will be very easy to heat the orangery in such

a position, as the temperature required is only two or three degrees over the freezing point. It must be remembered that Oranges are grown out of doors all the year round in parts of France and Spain where it freezes every winter. If the plants, after all the care taken to prevent their growth in the houses, begin to vegetate, and if the young shoots are more than an inch in length, it would be far preferable to cut them back than to let them retain a growth which is sure to be disfigured and spoiled in the open air."

FORCING THE WHITE LILAC

The production of the white Lilac seen so abundantly in Paris during the winter and spring is often a source of curiosity. To meet with a mass of it in October, quite white and deliciously sweet, is a pleasant surprise to the English visitor. You may see large bunches of it in every little flower-shop in the month of January, and it is always associated with the early Violet and the forced Rose. This Lilac is the common kind, and yet it is perfectly white. French florists have tried the white variety, but they do not like it—it pushes weakly and then does not look so pure a colour as the ordinarily Lilac one. They force the common form in great quantities in pots, and to a greater extent planted out, as close as they can stand, in pits for cutting.

The plants that are intended for forcing are cut around with a spade in September, to induce them to form flower-buds freely, and they are at first judiciously introduced to a cool house, but after a little while given plenty of heat, in fact, from 25 degrees to nearly 40 degrees C. = 104 degrees F. At the same time abundant humidity is supplied, both at the root and by means of the syringe, but the chief point is, that from the day the plants are placed under glass they are not allowed to receive a gleam of light, the glass being completely covered with the paillassons, or neat straw mats, such as are used for covering frames, pits, and all sorts of garden structures in winter. Thus they get the Lilac to push freely, and gather its white blooms before the leaves have had time to show themselves. The great degree of heat—a degree which we never think of giving to anything of the kind in England, and the total shade to which they are subjected, effect the bleaching. The French commence to cut the white Lilac at the end of October, and continue the operation till it comes in flower in the open ground. In the same establishments enormous quantities of Roses are forced, small, pretty, and unopened rose-buds being in great demand in Paris.

Villa Toradale, Darien, Connecticut

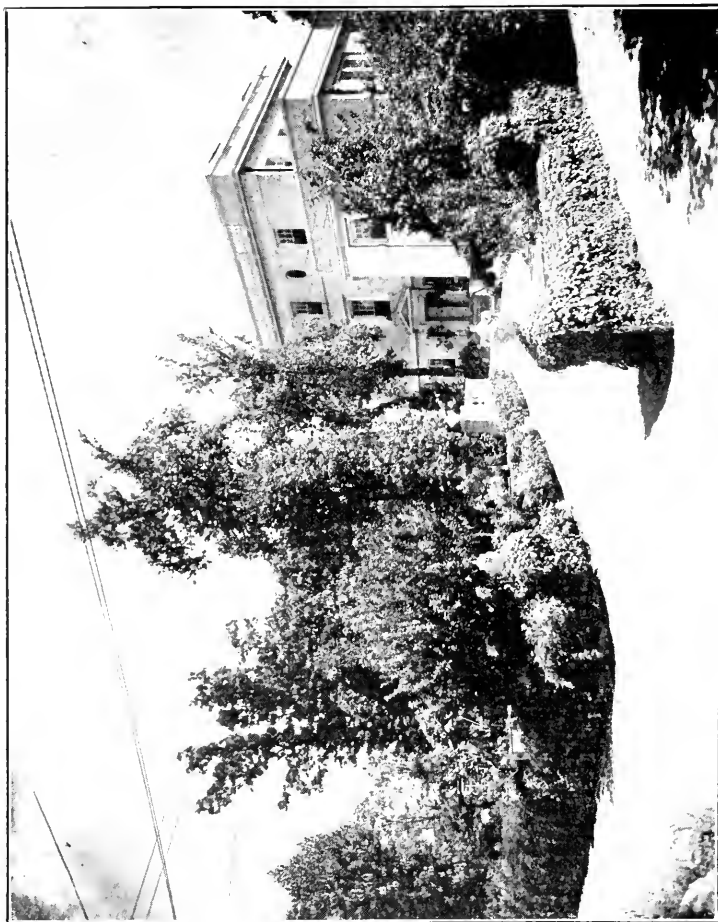


VILLA Toradale is an interesting experiment which depends for its success, as much on *floral* treatment, as on its architectural planning; so far as we know it is the only attempt made on the Atlantic Coast to reproduce, on a scale appropriate to conditions which will prevail for some time at least after the war, the elegant and fragrant stage setting of the Riviera or Lake Como.

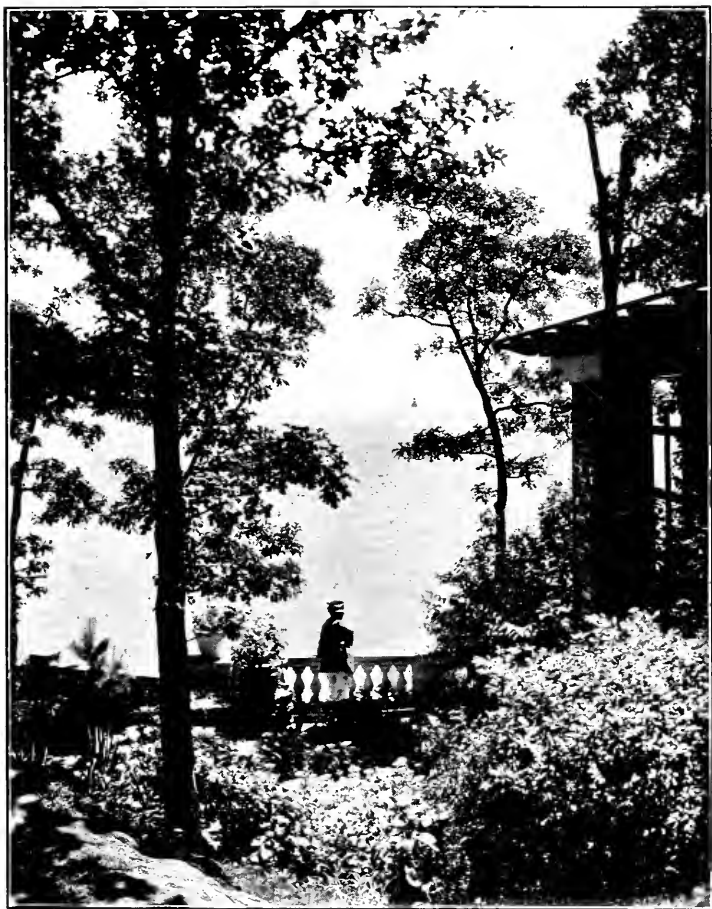
Strangely enough, it was not undertaken after the war had begun, nor even with the war in view—for it was carefully thought out in 1912, and actual construction was begun in 1913; the views which we show were taken in August of 1917; they thus exhibit the result of 4 years floral growth, the trees which we see having all been brought to the place and planted during that time—with the exception of some scrub oaks and a few native beeches which existed on the property at the time it was acquired in 1912, and which were, as far as possible, preserved in placing the house and a double garage on the plot.

The problem was fourfold—produce within easy commuting distance of New York and New Haven (not over 1 hour by rail or 38 miles by motor)—the illusion of Europe—with a minimum of first cost and maintenance—in such a way as to permit its use with the maximum of comfort and style, when desired, in all 4 seasons.

The site selected affords sea-bathing directly from the south terrace of the Villa by steps fashioned through the natural horizontal cleavage of the rock, so that the bedroom is the bath-house—and as the rise and fall of the tide is only about 4 feet, one may take a dip at any time of the day desired.



ENTRANCE TO VILLA (NORTH SIDE)
SHOWING COURT



VIEW ALONG PERGOLA
LOOKING SOUTH OVER THE SOUND

As additional attractions—there is excellent fishing on this coast, and a land-locked harbor, known as “Five-Mile-River” furnishes opportunity for yachting and powerboating, while the Wee-Burn Country Club, which is about a quarter of an hour by motor, provides golf and tennis.

The natural features of the property have been skillfully taken advantage of in planning the terraces—and a rock garden in addition to a formal sunken rose garden, blend harmoniously both in form and colour, while pergolas covered with honey-suckle and various varieties of grape and other vines ensure, on the east and west lines of the property, privacy as complete in the landscape as if there were no neighbours; these lines are at right angles to the north-shore of the Sound and create a vista 8 miles long, directly across to Huntington Bay on Long Island, over a sheet of water which is rippled by a south-westerly breeze, almost as regular from May to September, as the trade-winds in the Tropics.

Like the famous “Bagatelle” in the “Bois” in Paris, this property could well bear the motto “Parva sed Apta,” for its extreme dimensions are only 100 feet along the high-water line of the Sound by 200 feet in depth at right angles to the water line—in short, exactly one-half of an acre in area—situated on a peninsula appropriately christened “Riva Bella,” and constituting a private park of some fourteen properties, six of which run on to the high ledge of rocks which form the south shore of the peninsula.

From the main southerly terrace, which is on the same level as the dining and living rooms of the Villa, a descent of about 40 feet to the water's edge is negotiated by secondary terraces—arranged in lengths of about 10 feet each, in steps running diagonally in Italian fashion, from the east and west lines of the property and along the lines themselves, and providing walks of about 1000 feet, including by-paths and north and south terraces, each walk and terrace being bordered by beds of flowers which succeed each other in time and colour, *Iris*, Peonies, *Gladiolus*, with Dorothy-Perkins and other fall-ing plants softening the walls of rounded stones which furnish



TERRACES (SOUTH)
ON SOUND FRONT

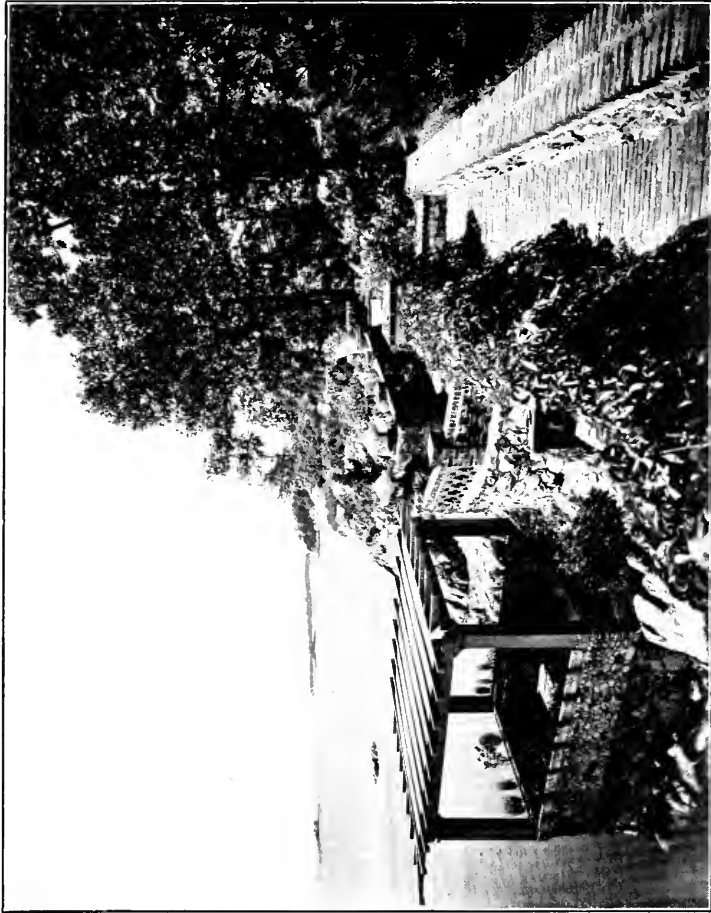
a succession of level surfaces on which the eye is forced to rest—surfaces made interesting by marble benches, a sundial, trellis, work and balustrades.

In four years, Virginia creepers have covered the stone walls on which the pergolas rest—while apple, peach, cherry, plum and other fruit trees, pruned for shade rather than fruit, lend peculiar softness to the grass plots and brick walks on the north side of the house, which is 40 feet deep by 50 feet long, and runs parallel to the Sound front. On the west side of the house and communicating with its ground and first floors is a garage for 2 large or 3 small cars; the south wall of the garage forms the background for the sunken rose garden; its second story includes servants' bath and sleeping rooms.

The house is built on the plan of the "Petit Trianon" at Versailles. This is made possible by the rock formation which, rising abruptly from the water falls away as sharply towards the north, so that by properly placing the house, its north façade, at the entrance court is of 3 stories and the south side towards the Sound only 2 stories above the main terrace; French collapsible canvas awnings advance over this terrace, stained in the yellowish-red of the sails in the lagoons of Venice, and form a contrast with the greyish-white stucco of the house itself.

The garage being 30 feet deep by 22 feet broad, passageways 14 feet broad from the north side of the property to the main terrace on the Sound (south) side, are left on either side of the buildings; these passageways each have natural rock steps and afford along the west property line shaded beds which are filled with lilies of the valley and indigenous American flowering plants requiring moisture as well as shade.

The easterly passage affords a service entrance to the kitchen, as well as access to the south fronts, and as the ground drops away along the north line of the property, in proceeding from the west towards the east, delivery wagons are completely hidden while standing in front of the east passageway; this leaves the court approach entirely free for the use of the ownership and their visitors. The passageways are closed by trellis



VIEW ALONG SOUTH TERRACES
OVERLOOKING THE SOUND AND
IN WESTERLY DIRECTION

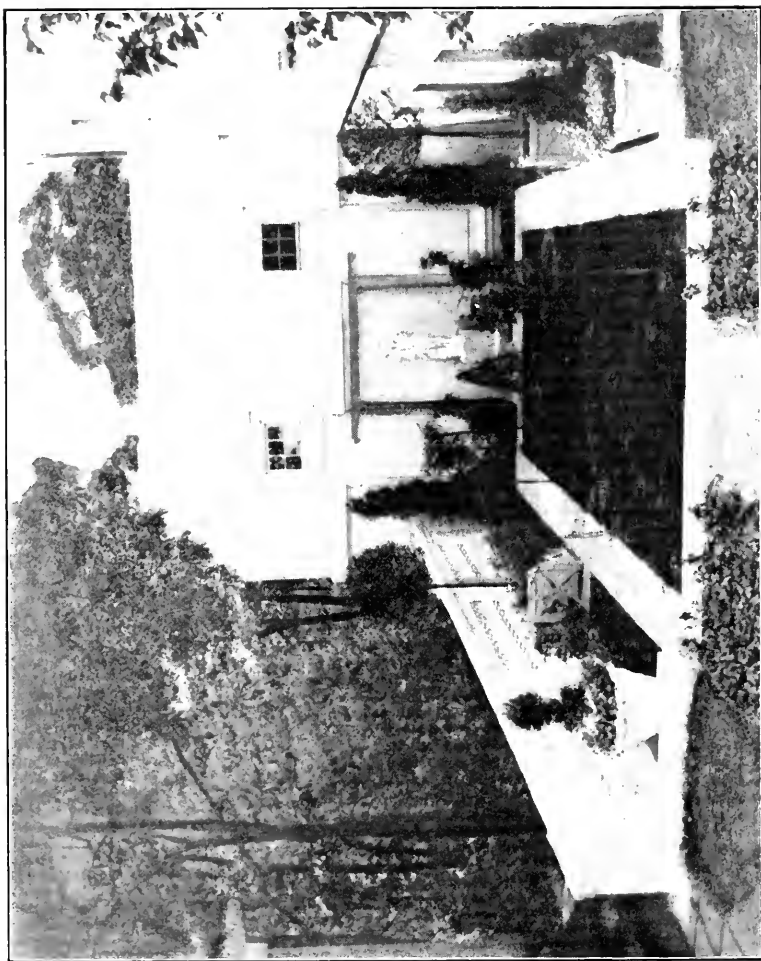
work gates, which effectively block access from the north line of the property to the main south terrace and thus ensure absolute privacy on the Sound side. By means of trees and lilac bushes, as well as wistaria, ingeniously placed, the trellis gates are completely hidden from the view of the passer-by on the north side of the property.

It is impossible in a short description to enumerate in detail all the peculiar features of this unique property but as the architectural and floral treatments are so interwoven as to form a concrete whole, we show plans of the various floors of the house and garage and a sketch-map of Riva Bella, showing the orientation of the property and its approach.

The exterior lines of the "*corps de batiment*" were suggested by a "*bastide*" (villa) near Marseilles. The interior of the Villa is in Colonial for the masters' bedrooms (5 in number) and in period styles for the living rooms (parlor in Louis XVI, mirror gallery in Louis XV, living room in Italian Renaissance, dining room in Adam).

Unlike the Trianon the house contains every modern convenience, a large elevator capable of taking up and down an invalid's lounge, furniture, etc.—a vacuum cleaner, house and long distance telephones to rooms, public service water, electric light and power, open fireplaces and a hot-water heating system throughout for winter occupation; the hardware in the living portions of the house was imported from France; the fixtures are by well-known art metal workers and the plumbing and drainage are by the two best known firms in that line; besides large closets, storage and refrigerator rooms, there is a laundry and indoor hot-air dryers; the kitchen is so arranged as to be cool in summer and by closing doors in passage-ways, warm in winter; the pantry is large, light and airy; there is a servants sitting room.

The building is fireproof, the floors are on arches, and all spaces under sills and bare boards are filled in with plaster to prevent vermin from entering the house, and as a protection against fire there is an outside hydrant besides indoor floor connections.



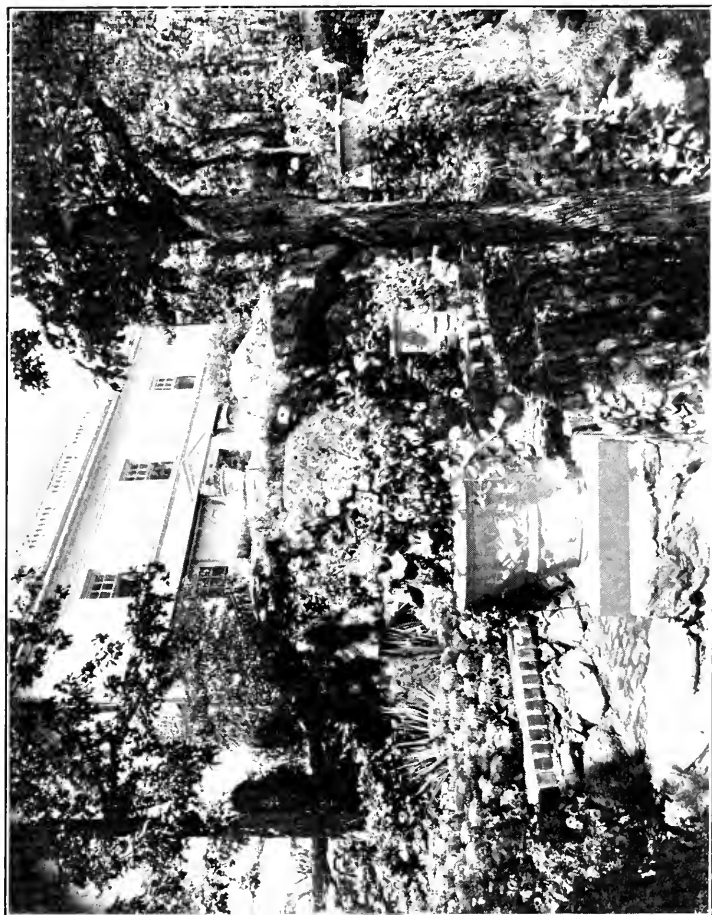
SUNKEN ROSE GARDEN

The property is cared for by a couple, the man keeps the grounds in shape and runs a small car, etc.; the woman is cook and attends to the upstairs part of the house. When members of the ownership inhabit it, they bring their butler and ladies maid.

This Villa was the property of the late Mrs. W. Wright Hawkes of New Haven and Darien—it now belongs to the family, one of whom is a governor of the International Garden Club; he has in a public spirit authorized the Club's Secretary to issue passes to members—on their application, to view the property which should be seen in June, July or August.

Following is a list of the plants in the Rock Garden:

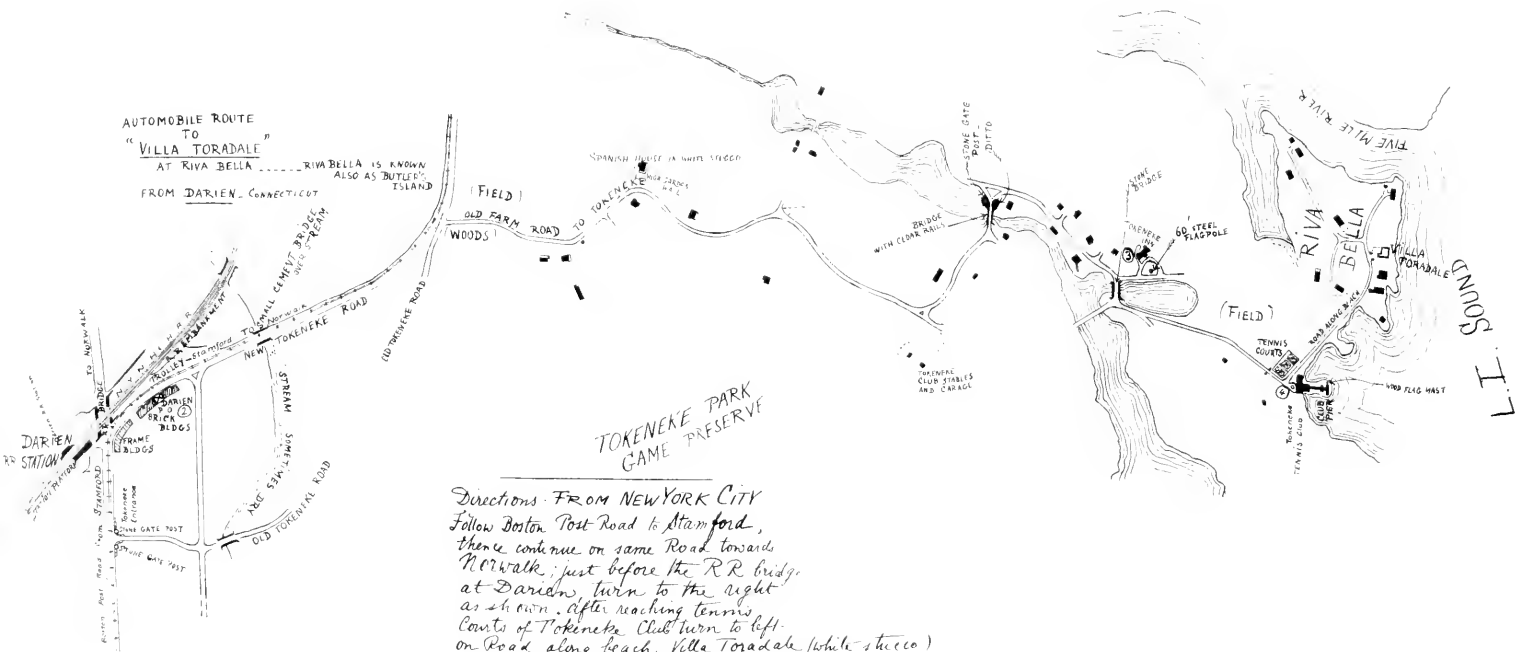
<i>Alyssum saxatile compactum</i>	<i>Eryngium</i> in var.
<i>Aquilegia</i> in var.	<i>Heuchera</i> in var.
<i>Arenaria balearica</i>	<i>Iberis sempervirens</i>
<i>Armeria maritima</i> in var.	<i>Iris pumila</i>
<i>Aubretia</i> in var.	<i>Linum perenne</i>
<i>Bellis perennis</i>	<i>Saxifraga</i> in var.
<i>Campanula</i> in var.	<i>Sedum</i> in var.
<i>Dianthus deltoides</i>	<i>Sempervivum</i>



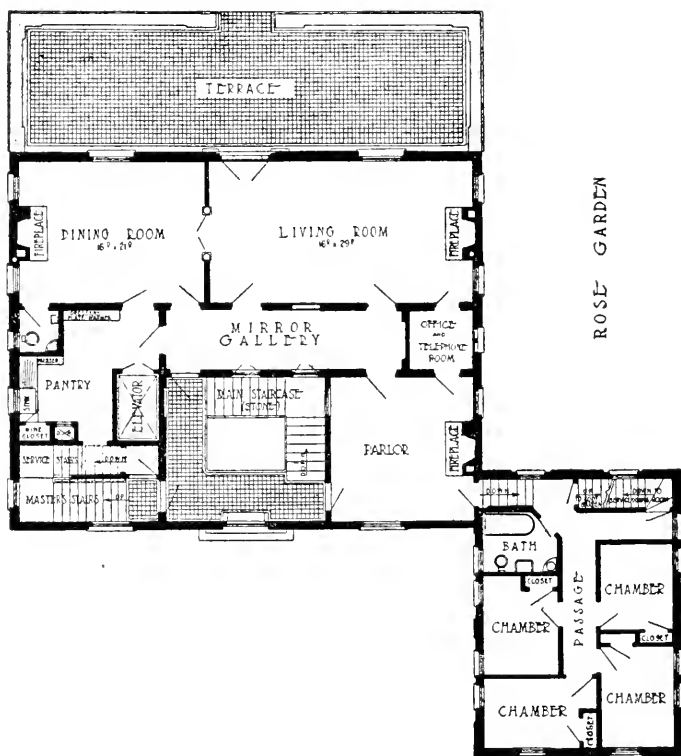
STEPS AND TERRACES LEADING UP
TO SOUTH SIDE OF HOUSE
OVERLOOKING THE SOUND



ENTRANCE HALL

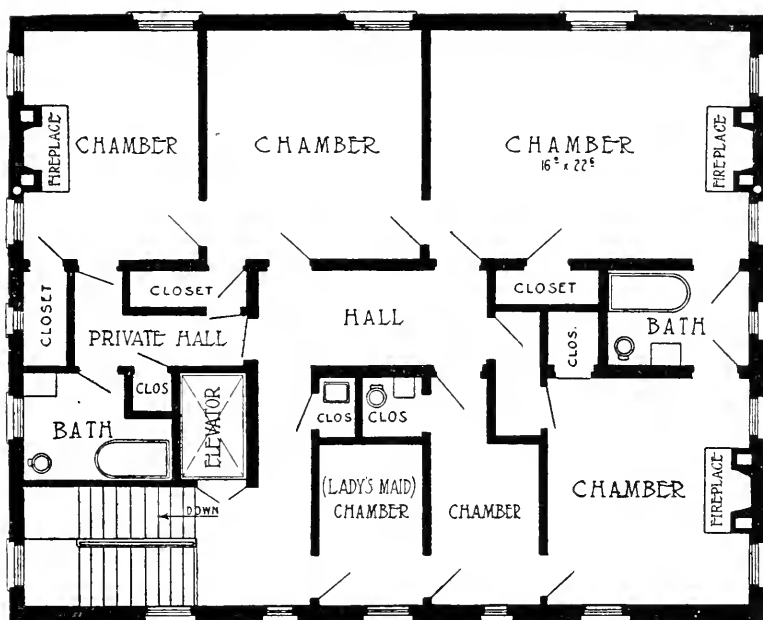


Directions FROM NEW YORK CITY
Follow Boston Post Road to Stamford,
thence continue on same Road towards
Norwalk; just before the RR bridge
at Darien, turn to the right
as shown. After reaching Tennis
Courts of Tokeneke Club turn to left
on Road along beach Villa Toradale (white stucco)
is entered by a Court surrounded by a
white stucco balustrade, at the entrance.
At 2 gate posts of stone in which are large balls.
Landmarks to explore for: (1) Darien Post office - (2) Tokeneke Inn -
(4) Tokeneke Beach Club.



ROSE GARDEN

SECOND-FLOOR PLAN
North side of House



THIRD-FLOOR PLAN
North side of House

Gladioli

By I. S. Hendrickson



CONSIDERED from every angle Gladioli comprise one of the most delightful groups of what are known as summer-flowering bulbs for they combine the minimum of special care compared with many other flowers and the maximum of satisfaction for the attention given, and the cost to procure them. They have been variously called the "king of summer bloomers" and the "peoples Orchids," but whatever title is given them they are demanding more and more space and attention in the garden of today.

While you will find only here and there a successful Rose garden, there is no reason why almost anyone should not have a successful Gladiolus garden, as their ease of culture brings them within reach of the most amateur of garden makers and they also respond to the extra care of the expert; they are within the reach of anyone that has a little land, because they are so moderate in price, often selling as low as 15 cents and 25 cents a dozen for Mixtures which will give a certain amount of satisfaction, or if one chooses to spend larger sums he will have the choice of some of the very finest varieties produced, but it is possible for one that wants to spend only a small amount to get a very good collection.

Although about 90 species originally came from the Cape of Good Hope, very few are now found in cultivation, as the work of the hybridizer has produced such wonderful results in the way of hybrids, that are marvels of beauty that the species seem commonplace and have largely disappeared from cultivation.

In years gone by the impression prevailed to a large extent that a Gladiolus was just a common red flower, but anyone

that has recently visited a Gladiolus Show knows that this is far from true now as there are thousands of varieties comprising every conceivable color, shade and variegation, some gorgeous and dazzling, others soft with the most delicate tints, rivalling delicate Orchids.

There have been various results obtained by hybridizing the original species, the following types are now considered standard and have a place in nearly every collection.

GANDAVENSIS. A very valuable and satisfactory class on account of its solid colors and compact habit. The flowers are medium in size but of very good form. Introduced in 1841 by the great hybridizer Van Houtte. "Augusta" and "Eugene Scribe" are good examples of this type.

LEMOINEI. An early flowering type which was raised by M. Victor Lemoine of France and often spoken of as the Butterfly type. The flowers were originally medium in size, but some of the later productions are very large, showing wonderful contrasts in color, being marked and spotted very distinctly. The form of the



GLADIOLUS
LIGIONNAIRE
PINK WITH CRIMSON,
YELLOW-EDGED BLOTCH

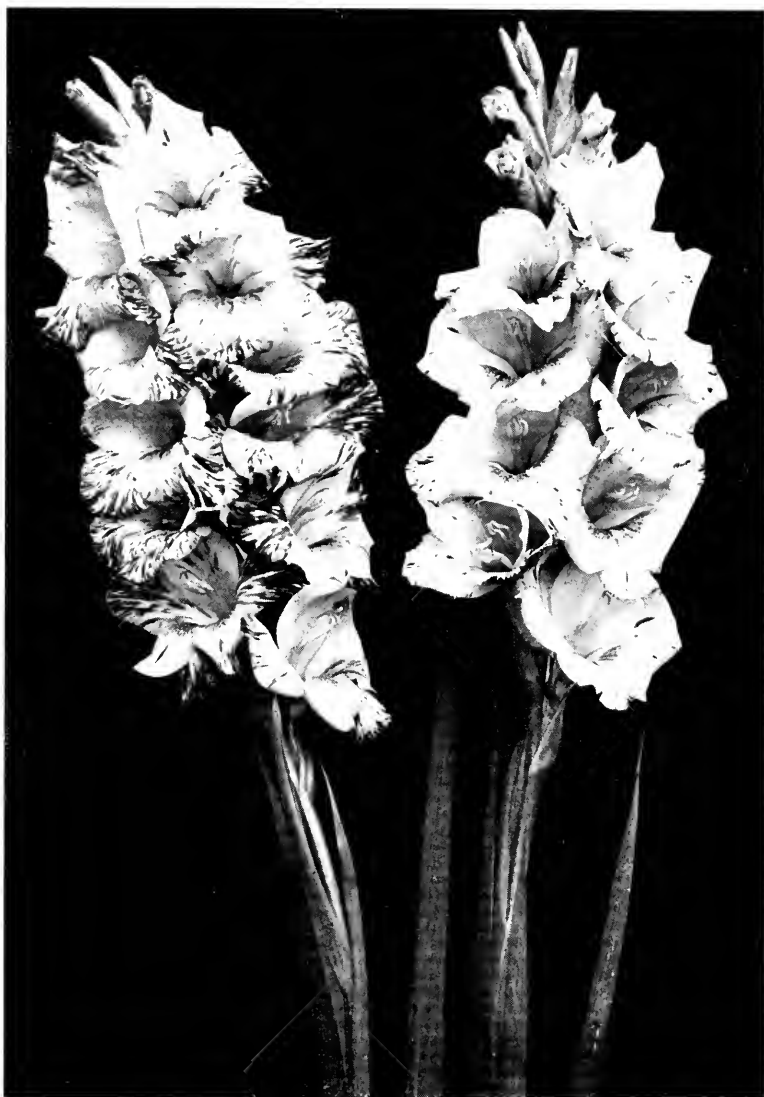
flower is usually hooded. Well known varieties of this type are "Baron Hulot," "La Luna" and "La Couronne."

CHILDSI OR GIANT. This type resulted from the crossing of Sandersoni and a variety of Gandavensis which was effected by Max Leichtlin of Baden Baden, Germany. These hybrids are in many respects the best so far produced and are noted for size and beautiful colors. "America" "Mrs. H. W. Beecher" and "Prince of India" are of this type.

KUNDERDI OR RUFFLED. This type was introduced by Mr. Kunderd of Indiana, some years ago, and has become very popular because of its ruffled and fluted petals. "Glory" was the first variety introduced and is a good example of the type.

PRIMULINUS HYBRIDS. These are the result of sowing the seed produced by the Primulinus Species which originally came from South Africa. The flowers are small, the spikes are usually longer and thinner than in other types, but they are very graceful and decorative, as the colors which range from Sulphur-yellow to chrome-yellow, all shades of orange with now and then a cream and salmon among them are very artistic. They are easy to grow, moderate in price and very popular where dainty decorations of this flower are wanted.

New varieties or types described above come entirely by sowing seed and they are obtained by either hand hybridizing or natural hybridizing, that is to say, some growers cross and re-cross the flowers while in bloom and save the seed therefrom others pick the seed from the best varieties and then after these seedlings make blooming bulbs which takes from two to four years, the best are selected out and if considered worthy, given a name; it may be that only 1 per cent may be worth giving a name out of thousands and thousands of seedlings, as in looking for varieties to name the greatest care must be taken to select only those that are really superior and distinct from those previously selected, good in substance, fine in form, etc., the balance of the stock can be used as Mixtures.



GLADIOLUS
SCRIBE
WHITE AND CARMINE

Culture

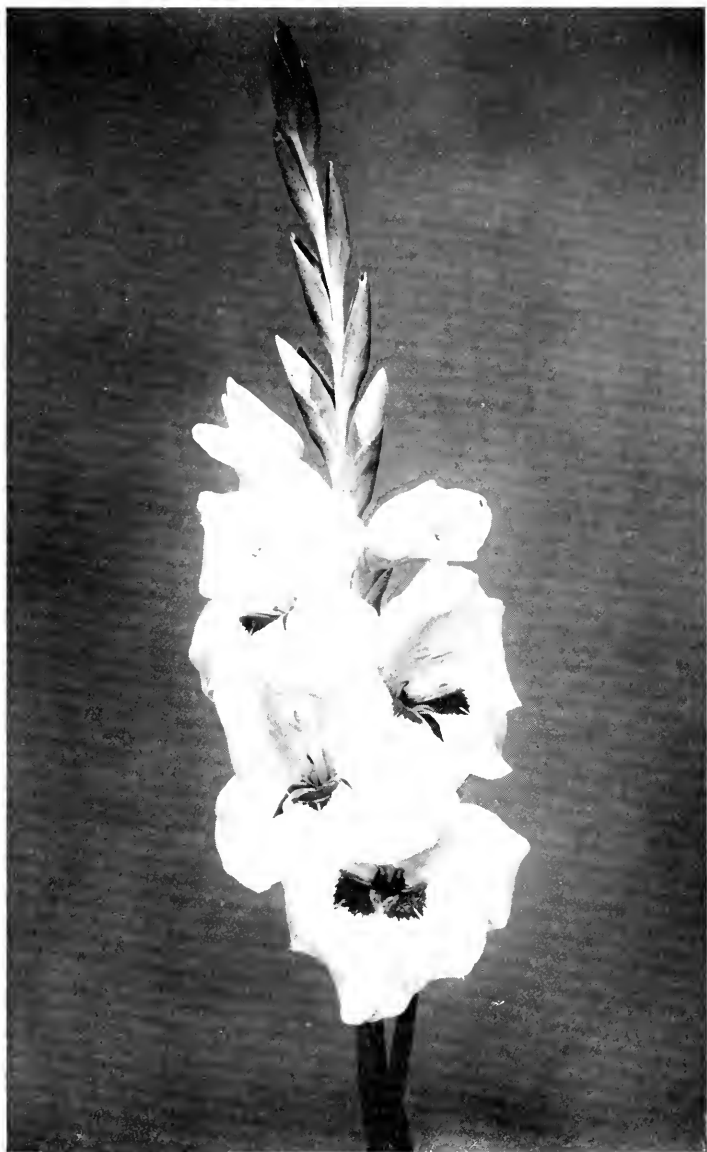
For garden decoration they are very effective planted in small groups in the border, and as there is such an endless number of varieties to choose from it is possible to get some variety to harmonize with any color effect anyone desires. If they are wanted only for cutting, they are best planted in rows 15 to 36 inches apart as best suits your garden and the way you intend to cultivate them and set in either single or double rows about 4 inches apart each way and about 4 inches deep in heavy soil and 5 or 6 inches in light soil; any good garden soil that would produce vegetables will do for them and they need only about the same cultivation as you would give a vegetable crop.

If you have a quantity of the bulbs it is a good plan to divide them in several parts and make your plantings two or three weeks apart which will insure a longer season of bloom; they can be planted anytime after the ground settles in the Spring and up to the 1st of July; the bulbs coming into bloom 12 to 14 weeks after being planted; by so planting, flowers can be had from July until October.

As a Cut Flower

The *Gladiolus* is essentially a cut flower and will rival nearly any other in keeping, as they can be kept fresh and beautiful after cutting for 5 to 10 days by changing the water each day; it also helps to nip off the old blooms. If the spikes are cut when two or three flowers are open the entire stalk will gradually open up after it has been put in water.

They are also very adaptable for sending to friends at a distance, as they will arrive in excellent condition if just a little pains are taken when shipping; the spikes should be cut when the first flower opens, put them in water for two or three hours. Then either mailed or sent by express they will stand a journey of two or three days, and when placed in water will quickly respond and unfold their petals.



GLADIOLUS
LA LUNA
YELLOW AND WHITE

Best Varieties

When one attempts to suggest a list of 12 or 25 best varieties it becomes rather a difficult thing to do, as so much depends on taste in colors. Out of the thousands of named varieties that are or have been on the market, it is almost safe to say that hardly two persons would choose the same 12 or 25, but from observations during recent years, the following 25 will hardly disappoint anyone. It is selected with this thought in mind—moderation in price—highest standard of form—the colors generally liked by everyone.

Gladioli

ALICE TIPLADY. Large flower, beautiful orange saffron color.

AMERICA. Large flower, flesh pink, beautiful.

ATTRACTION. Deep, dark rich crimson, with a very conspicuous large pure white center and throat. A most beautiful and attractive sort.

BARON HULOT. Rich deep color of an indigo shade.

CARDINAL. Perfect flower and spike, very large and the brightest, clearest and most intense cardinal-scarlet yet seen. Very rich and showy.

DAWN (Groff's). Strong vigorous grower. Flowers salmon, shading to light; claret stain on lower petals.

DESDEMONE. Immense flowers of ashy-rose color, striped violet; large dark-red blotch edged with ivory-white.

EMPRESS OF INDIA. Rich dark maroon, almost black. A rare color.

EVELYN KIRTLAND. The flowers, of strong substance, are a beautiful shade of rosy pink, darker at the edges, fading to shell-pink at the center with brilliant scarlet blotches on lower petals; the entire flower showing a glistening, sparkling lustre. Very tall spike. Extra fine form and color.

FASCINATOR. Splendid large flowers of salmon-pink tinted with flames of carmine; throat blush with carmine lake pencilings; long well filled spike.



GLADIOLUS
LE TRIOMPHE
ROSY LILAC

FIREKING. Long graceful spikes, showing half a dozen immense blooms open at the same time. Color, intense fire-scarlet. More brilliant than *Brenchleyensis*, *Cardinal*, *Mrs. F. King* or any other variety. Will become the leading cut flower variety of its color.

FLORENCE. Very large flower, bright lilac, large white center. Splendid.

GLORY. Each flower petal is exquisitely ruffled and fluted. Stalks very robust and produce from eight to twelve massive beautiful flowers, which expand wide open and are delicate cream pink with a neat crimson stripe.

HALLEY. The predominating color of these flowers is delicate salmon-pink with a slight roseate tinge, though the lower petals bear a creamy blotch with a stripe of bright red through the center, the whole producing a delightful effect.

LA LUNA. The large heavy buds open as pale yellow, changing to nearly white when expanded.

LIGIONNAIRE. A splendid shade of cameo pink with crimson blotch edged with pale yellow. Strong spike of well set flowers.

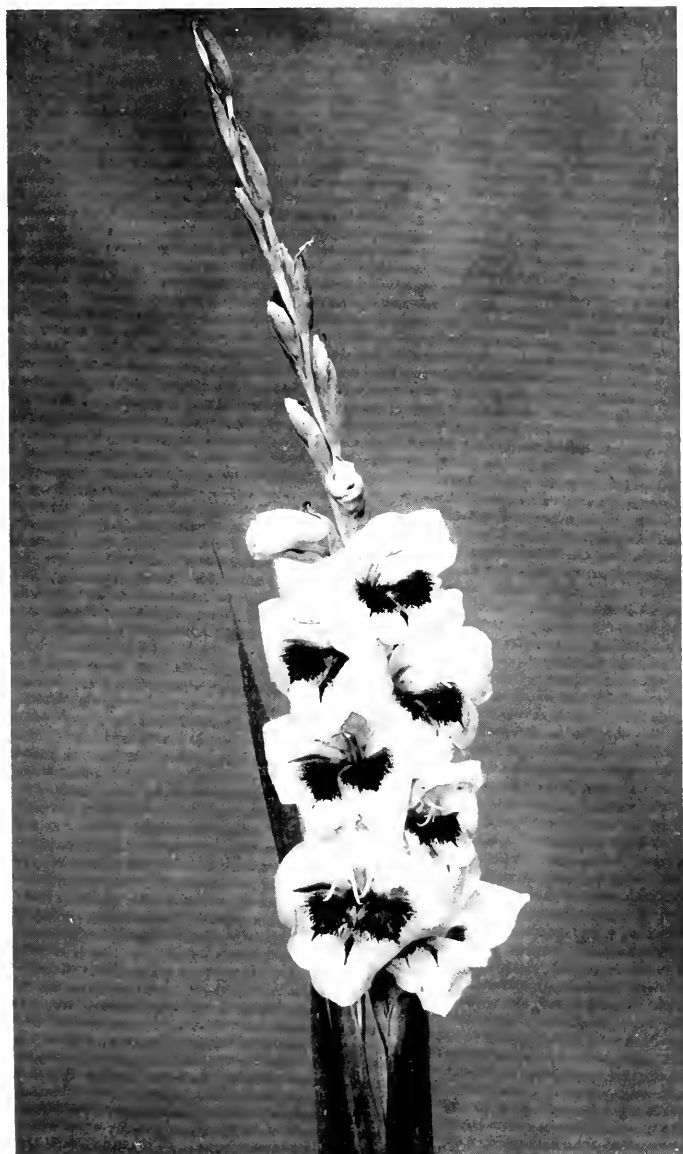
MARY FENNELL. Beautiful deep lavender flowers on a tall slender spike. Lower petals pencilled with primrose-yellow.

MRS. F. KING. Light scarlet of pleasing shade.

MRS. F. PENDLETON. The flowers are very large, well expanded, of a lovely flushed salmon-pink, with brilliant carmine, or deep blood-red blotches in the throat, presenting a vivid contrast of orchid-like attractiveness. It is of the *Lemoinei* type in form and color effect, with a *Gandavensis* stem, so that it takes up water freely and opens up perfectly nearly every flower after being cut and placed in water.

NIAGARA. In color the flowers are a delightful cream shade with the two lower petals or segments blending to canary-yellow. The throat is splashed with carmine, and the lower ends of the outside petals are also blushed with carmine.

PEACE. Flowers are large, of good form, correctly placed on a heavy, straight spike. Beautiful white, with pale lilac feathering on inferior petals.



GLADIOLUS LEMOINEI
LA COURONNE

SCHWABEN. Delicate pale yellow, dark blotch in center.

SULPHUR KING. This is one of the most valuable yellow varieties ever produced. It produces a very long spike of the clearest sulphur-yellow flowers.

SCRIBE. A beautiful, large well-opened flower and an enormous spike. Color like the fine old Eugene Scribe, tinted white, freely striped carmine.

WILD ROSE. A remarkable variety and one that will gain in prestige as it becomes known, for it ranks with the very best. Color, very bright rose or blush tint, exceedingly delicate and pretty, and needs only to be seen to be appreciated. In its particular color it stands alone. Exceedingly fine for forcing under glass.

The Flower Garden

By Elsa Rehmann*



FLOWER garden is transitory, evanescent. Its moods are varying with the sunlight and the shadows. The changing seasons bring forth always something different with its cycle of flowers. They are like a pageant of fairies, intertwining their beautiful forms on edge of pool and lawn, of stream and pavement, along wall and lattice, interweaving their colors in harmonious rhythms.

The lure of the garden depends not only on its flowers; architectural details, enclosure, design, all have important parts to play. It is not in their separate parts but in their interrelated action toward garden effectiveness that their complete worth lies in the art of garden making.

In the arrangement of flowers the design has an important part. Take a big formal design, it demands broad treatment in its flower arrangement, the flowers are planted in big masses which will display the bigness of the design. In one summer garden, I know, Shasta Daisies were used in big solid masses all around its oblong shape. There were many other flowers in the borders but the other colors formed but a background for the white of the Daisies which emphasized the design. Take on the other hand a design made up of several parts, one will be the main garden where the succession of bloom is carefully carried through the seasons while the lesser parts of the design can be reserved for special effects, seasonal events, unusual color notes. Such a garden I saw one June near Philadelphia. The main garden was full of Columbine, *Iris* and Lupines, mainly white and blue with touches of cream and

* Photographs of Miss Marion C. Coffin's Gardens, used to illustrate this article, are printed with her kind permission.



WHITE GARDEN EDGED WITH
BOX, GARDEN OF
MRS. FREDERICK FRELINGHUYSEN
ELBERON, NEW JERSEY

pink. It was backed up by shrubbery and trees which hid two side paths. In one Oriental Poppies were blooming, the other was an evergreen path mostly conifers but at the farther end a lavender Rhododendron formed a wonderful background for a flame colored Azalea.

Take a straight path, for instance. The planting must be so distributed that the entire length of the borders appear in bloom all the time, the entire border must be one harmony of color. Take on the other hand a curving path that meanders first wide, then narrow between flower borders. The charm of the curving path is the surprises ahead for only short sections are seen at any one time. So the plants may vary in height, low and matlike in one part, tall and erect in the next; startling in color in one part, subdued and mild in the next; one part may be in full bloom, the next may depend on the green and gray green of foliage for its interest.

In formal gardens, if the inner beds are low, it will enlarge the garden and bring it into full view; if the inner beds are high it will dwarf the garden (which may be just what you want) and make the side paths more secluded and more intimate. If the design is circular, the circular effect may be emphasized by planting the flowers in irregular concentric circles.

The enclosure plays an important part in garden composition. Wall and lattice form the fine architectural background for vines. Our gardens would be but poor without the Roses and *Clematis*, *Wistaria* and Grape vines, Virginia Creeper and *Actinidia*, Honeysuckle and *Jasminum*, Bittersweet and Trumpet vine, which interplanted make an interwoven pattern of leaf and blossom as a background for the flowers.

Vine covered walls and hedges only define the outlines of a garden, high shrubbery and trees are needed as well to enclose it. Such enclosures give the garden its needed privacy, give it interesting skylines and exclude all outside objects which might divert attention from it.

In naturalistic gardens shrubbery and trees form the only background, for the flowers are closely related to them.

They often complement the flowers in carrying out special color notes. The examples of *Forsythia* with daffodils and lilacs with purple *Iris* are familiar. I saw one of the white Bridlewreaths in back of lemon and cream *Iris pumila*, the dwarf *Iris*, in a lovely delicate combination of yellow and white for May and again the lilac Butterfly Flower with lavender and purple Phlox made a charming rhythm early in September.

Crocuses in long slender drifts in front of early Cherries, Poet's Narcissus in front of *Amelanchier* with its delicate white flower clusters, deep yellow Daffodils in front of white Magnolias, soft rose tulips in front of the Crabapple, *Pyrus floribunda*, whose pendant branches hang heavy with rose flowers, each is a masterpiece of flower and tree in spring loveliness.

Perennials are the permanent plants in the borders, they make up the major part of the garden, they play the heavy parts in the garden drama. Can you imagine a garden without its *Iris* and Columbine, its Peony and Larkspur, its Hollyhock and *Phlox*?

It is the perennial which gives the garden its stable and constant flower arrangement. It is the annual which is the experimental element in the garden. It is the annual which devises new color effects in minor details, that gives the garden new interests without disturbing its old perennial vigor. Creamy yellow Snapdragons will soften the deep purple of *Veronica*, steel blue *Salvia* will be wonderful against dark red Dahlias, French Marigolds with Chrysanthemums of the same bronzy tone is a real wonder touch for October. Annuals, too, successfully supercede with late bloom the spring bulb garden. Twice I have seen Zinnias used in this way with great effect, once in a large naturalistic garden where the colors were used in masses, first yellow, then orange, then deep red, another time mixed seeds were scattered through a small dooryard border in a partcolored pattern.

Bulbs are especially valuable for spring effects. Bulbs like Crocuses, Grape Hyacinths and Daffodils are most valuable for naturalizing and much more naturalizing could be done

with very little effort even in small places. Hyacinths, early and late Tulips, Fritallarias, Camassias and *Eremurus* are better in the garden where they will receive attention. *Fritallaria* is an old garden favorite and its red variety, the Crown Imperial, looks very well with a deep red early Tulip. *Eremurus* I saw for the first time in a great naturalistic garden where the dark green of trees brought out the effectiveness of their great spikes. They are out of scale in a small garden. Of all the bulbs the late Tulips, the Darwin and Cottage types are the most marvellous to me. They brought me a new appreciation of color values, color range, color delicacy. Is there anything more exquisite than the soft buff and golden bronze of Clio or the heliotrope of Dream or the purple of Jubilee?

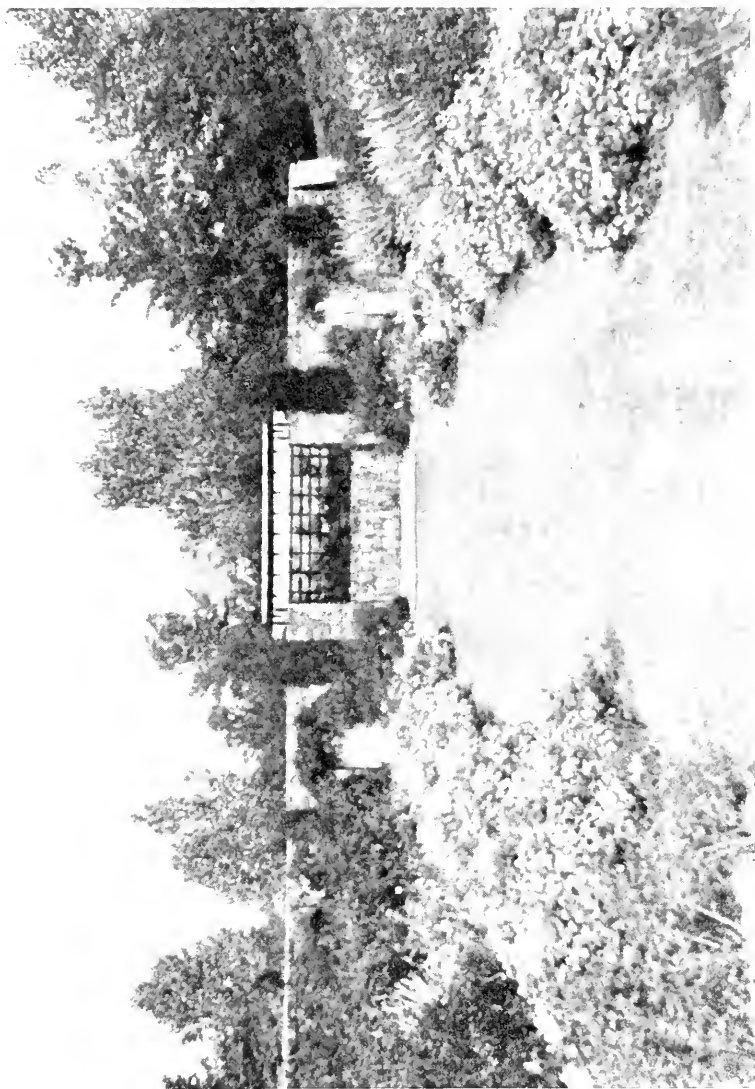
Bedders have been so much abused in gardens and especially in the older type of public park that I might advise being on the safe side and not using them at all. The haebaceous border has fortunately superceded the bedding plants. Most gardens do very nicely without them. There are places, however, when a uniformity of effect or color is desired where bedding plants have a legitimate place but in such places it must be the bedder brought up to date and skillfully used. I have seen Tulips, Canterbury Bells, Heliotrope and Chrysanthemums used as successive bedders in the central beds of a big formal design. Near Philadelphia I saw Cinerarias used as bedders in June. Polyantha Roses, the dwarf baby ramblers, make very good bedders and come in very good soft shades. Single colors can be used, but far more interesting are the beds where several shades are combined. In the newer bedding methods, the plants are not laid out with rule and measure, in stiff rows but are scattered irregularly through the borders.

Potted plants are very useful in the garden. They can be plunged into the ground to heighten the color effectiveness of special parts of the border much in the way annuals are used. Miss Jekyll uses blue Hydrangeas in this way in her blue and gray border and she uses pink Hydrangeas with pink and white

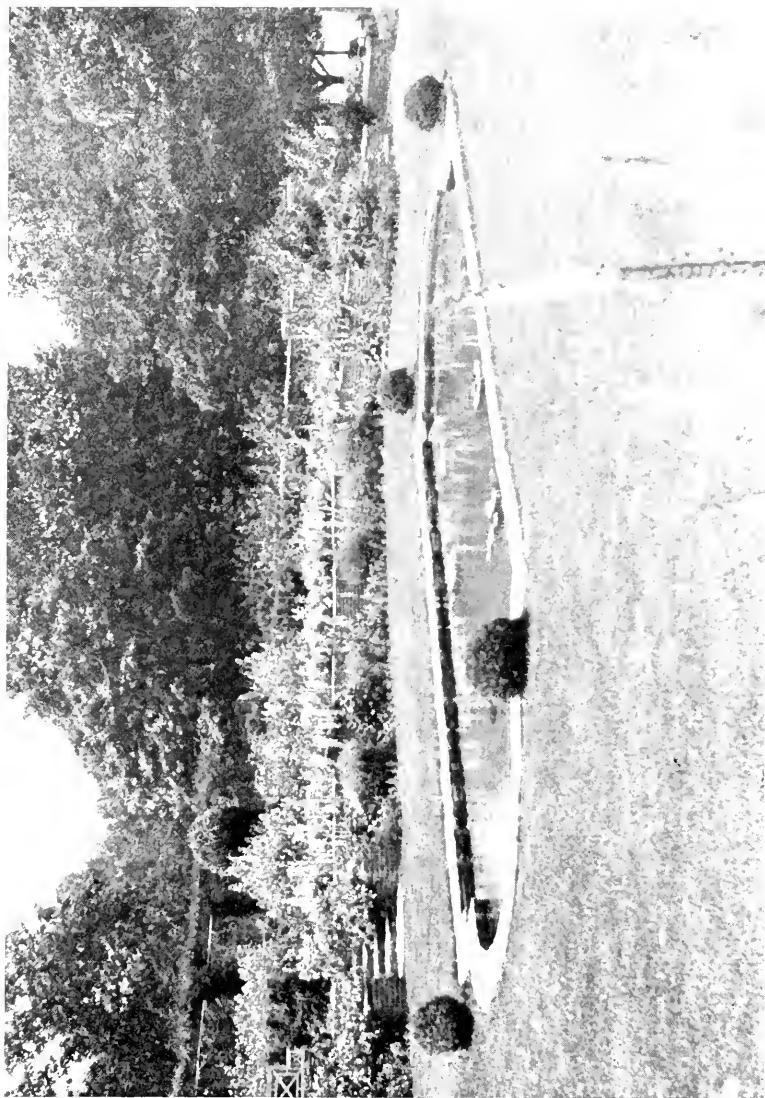
Snapdragons, white Dahlias and white Asters. I have seen in old-fashioned gardens, pots of Sweet Verbena and Rose Geranium plunged into the ground amid other plants for a bit of fragrance. Then, potted plants can be used in the way the Italians love to use them, either in rows along terrace walls, on steps and in courtyards or as important parts in the garden design. They will emphasize the design, make telling accents and their vases and pottery have a way of making the garden habitable as they do a room.

I have an aversion for standard Roses and Heliotrope or other standards which depend on a white stake for support. Whenever I have a dislike for a certain plant I always begin to look for an appropriate place for it because from experience I find that it is really not an aversion for the plant itself but for the improper use to which it is put. I am quite certain that standard Roses and Heliotrope have their appropriate place for very formal stiff effects in very small ultra formal designs or perhaps in the happy tangle of an old fashioned garden.

Roses must be mentioned among garden flowers. Hybrid Perpetuals and Hybrid Teas are best when they have special gardens or at least special beds. Small rose gardens often make delightful little introductions to larger herbaceous gardens. Polyantha Roses I have mentioned as bedders, they make excellent edgings for rose beds and can be often used to good advantage as a long blooming element in a small flower border. Rose climbers come in such wonderful shades now; there will be more and more wonderful effects when they are combined with flowers. Carmine Pillar roses with blue Anchusas, pink ramblers with white Foxgloves are but two familiar examples. And think of all the lovely yellow ones we are now getting, Gardenia, Gold Finch and Shower of Gold. Then there are the Bush Roses to make charming effects with flowers, white Madam Pantier with larkspurs, Persian yellow rose with tall lilac blue *Iris pallida dalmatica*, Harrison's Yellow Rose with the Yellow Day Lily, even the old Dog rose is charming tumbling amid mixed Sweet William.



A GARDEN OF ANNUALS
MRS. CHARLES M. CHAPIN
BERNARDSVILLE, NEW JERSEY



BORDERED WITH A SUCCESSION
OF PINK FLOWERS, GARDEN OF
MRS. BERTRAM H. BORDEN
OCEANIC, NEW JERSEY

Trees and shrubs enter the garden not only as backgrounds but often they are used as accents. Cedars and Arbor Vitae make columnar effects, Dogwoods spread their horizontal branches over seats, standard Wistaria and Lilacs have their place in accentuating the design and sometimes, but rarely, even such oddities as Weeping Cherries are appropriate for special effects in small gardens. Of course Box bushes must not be omitted. They are the finest of specimens. I like best the unclipped bushes. A near rival to it, but lacking its fragrance, is the Japanese Holly, *Ilex crenata*.

The effect of bloom in the garden depends on the way in which the flowers are planted. To plant in straight rows, in solid regular blocks gives the garden a stiffness, a regularity which defies all nature's graceful laws. Irregular clumps and longish drifts blend the flower groups together and weave one color into another. These drifts are like the flying streamers of a dancer, sometimes long, sometimes shorter, sometimes alone, sometimes intermingled with streamers of other colors and shades. Two or three kinds of flowers will be often intermingled as if you had mixed them in a bag and let them spill on the ground irregularly. We do this literally with bulbs. Handful after handful, hundreds upon hundreds, are thrown on the ground as a sower scatters grass seed on a still day and planted where they fall unless they are out of bounds. Hollyhocks, Dahlias, Heleniums and the larger plants are planted in irregular groups of three or five, sometimes seven in a group, while *Iris*, *Phlox*, larkspur, lend themselves to planting in drifts. There are plants like Columbines and *Gladiolus* which can be scattered through the border in quantity in a way the English call "dribbling in the plants," other plants like *Gypsophila* are best planted singly at intervals through the border, others like Yuccas and the Plume Poppy, *Bocconia cordata*, that are best singly or in groups of three on either side of path, or steps, or gateway.

As the flowers depend much upon the design so the distribution of bloom depends also upon the design. Either the whole garden must seem in bloom all the time, which demands a

distribution of flowers in such a way that every section of the garden has something blooming or certain related parts of the design must be emphasized by the bloom. In June, one year, I visited a garden I had planted and while I have clear recollection of various bloom, of Lupines, Spiraeas, *Nepeta* and masses of pink Oriental Poppies in the outer borders, yet the interest of the garden was concentrated on the central beds with the uniform but irregular planting of white *Clematis recta* wreathing its pendant flower laden stems between erect spikes of delicate blue *Anchusa*. Later in July the Larkspurs are blooming through the outer borders of the garden in a rhythmic sequence of white to deepest purple. The inner borders are then showing masses of Madonna Lilies as a foreground.

It is these big effects which carry out the design and unify it. Sometimes such major effects may be all that is wanted in a garden. I know one, a terrace garden, where orange Azaleas bloom in May, pink Peonies in June, Madonna Lilies in July, pink and white *Lilium speciosum* in August and deep blue Asters in the fall. These monthly effects carry out a succession of bloom, they vary in color and flower habit but the uniformity of each effect gives the borders a bigness, a breadth of feeling which carries out in a wonderful way the architect's idea for the terrace.

In a smaller way the planter who reserves Oriental Poppies for a big showing all by themselves for a secluded path has a similar feeling for big harmonious effects. Nature does the same when she reserves the delicate spikes of Snake-root for July bloom and plants them quite alone in big masses in front of the gray ledges in mountainous woods.

However, it requires a nice feeling to work out with these major effects a series of minor ones. For such minor effects there can be many different flowers used in many small clumps. It is these supplementary plants which enliven many a garden with interesting color contrasts and color harmonies. Take, for instance, a mass of yellow and purple Darwin tulips. They will make a charming color harmony, but fringe them with a few plants of Golden Tuft, and lilac creeping *Phlox* and in

duplicating the colors you have added a hundred fold to its interest. In the same way, a mass of deep red Zinnias will carry along the effect of deep red Chrysanthemum in a wonderful way. Pink *Phlox* is well enough in its way but mix with it a few pink *Lilium speciosum* and some pink Snapdragons or pink *Gladiolus* and you have achieved a marvel of color. On the other hand, combine larkspurs and Shasta Daisies and you have a familiar contrast of deep blue and strong white but add to these a fringe of *Heuchera sanguinea* with their delicate bells of coral and the effect immediately becomes soft and enchanting. Or take the flaring orange of Tritomas, the Red Hot Poker plant, it is a disturbing element in many a garden but really quite wonderful with lilac *Clematis* and white Asters.

This striving for effects for each month or season resolves itself into a sequence of effects in which the flowers of one effect merge into and overlap the flowers of another, until they are woven into a wonderfully wrought succession of bloom from the time the Snowdrops and Crocuses break apart the winter-hardened sod until the chrysanthemums fade amid the autumn glow in November. To attain the proper balance between the flowers of the various seasons is the difficult part of the succession of bloom.

The difficulty of keeping the garden always blooming is sometimes effaced by emphasizing the bloom of one season at the expense of another. This will not spoil a garden, it will add to it by varying the effect. Sometimes the garden will be in abundant bloom, sometimes a milder interest will be carried along by intermittent bloom here and there. In this relation it must not be overlooked that many plants like Iris, Paeonies and Chrysanthemums have effective foliage which makes them interesting when they are not in bloom. Foliage varies, too, in color, the woolly gray of Snow-in-summer, the glaucous gray of Sedums, the grayish tone of pinks, the blue of the spiny stems of Globe Thistle are interesting at all times.

The difficulty of keeping the garden always blooming is sometimes effaced by the happy opportunity to omit the bloom

entirely for certain months. I know a town garden for a family who close the house in June and do not open it again until September. There are a series of effects in the autumn with Japanese Anemones, Asters and Chrysanthemums, in the winter small evergreen shrubs give the garden winter interest, and in the spring Crocuses, Daffodils and Fritallarias lead up to a May climax in Darwin Tulips. This garden suggested to me a host of possibilities for spring and fall gardens for those who go to resorts and country homes in summer. For summer homes this order can be reversed and a garden with only two months of bloom to care for will be lavish with flowers.

In large places these seasonal effects can be divided into several gardens. One may be for very early bulbs, another for late Tulips and spring flowering ground covers, another for *Iris* and Lupines, a fourth for July and August bloom, still another for Asters.

Special colors may be reserved for separate parts of the garden area, white flowers along cool shady paths, red flowers against evergreens, orange flowers in sheltered nooks. This idea can be developed into special color gardens. One may be all white, white Crocuses, white Hyacinths, the white Tulip La Candeur, white *Iris*, white *Thalictrum*, white *Phlox*, white Asters, white Snapdragons that will carry along a full succession. It must be remembered in using white flowers that the effect is not pure white for the foliage of the flowers, the enclosing hedges and trees, the Box edgings for grass paths will make the garden green and white. Pinks borders are full of possibilities for pink has a wonderful range of shades. Yellow, too, has a wide range of tones from the faintest cream to rich golden yellow, bronze and orange. One of the most exquisite gardens I have seen was limited to orange flowers. The border was in front of a gray green house and solidly backed up by cedars. In May it was aglow with scarlet orange Tulips, in June with Oriental Poppies, in July with orange Butterfly Weed, in August with Tiger Lilies and Orange Tritomas that last well into the fall. All these plants are difficult to plant in the mixed border but their very brilliance made them a marvel-

lous choice for flower succession. Especially fine was it, one July, when for a brief period Butterfly Weed, Lilies and Tritomas were all out together.

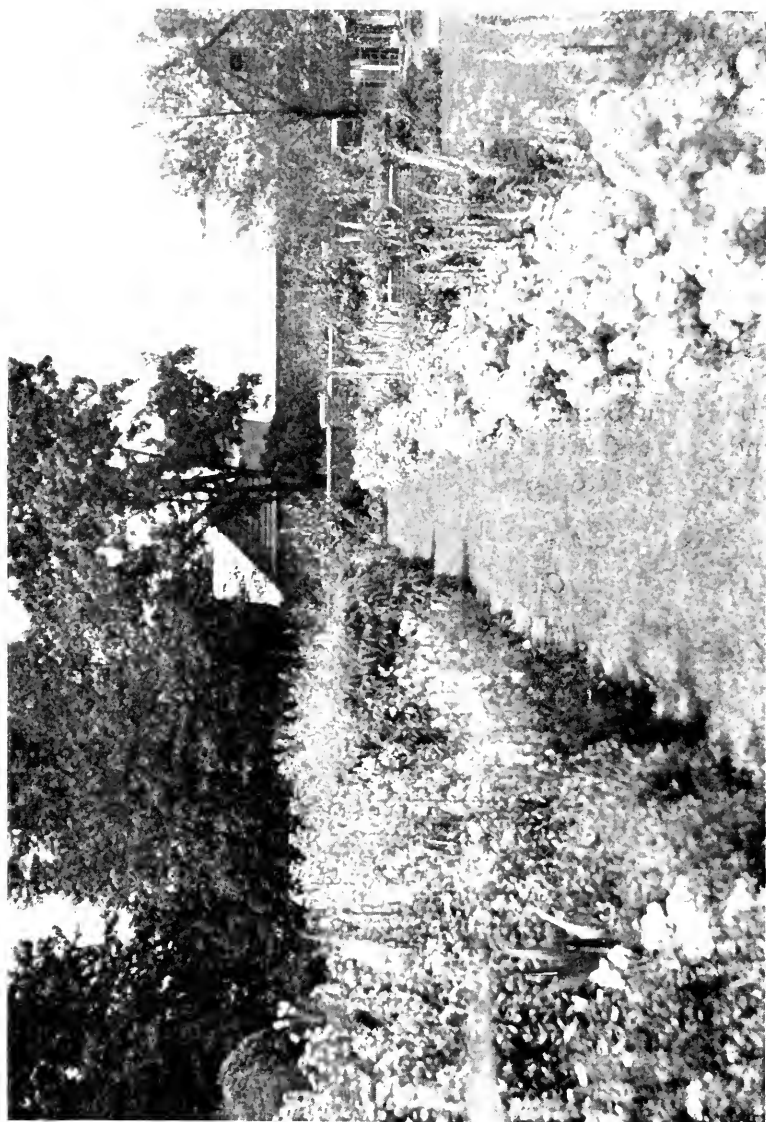
Keeping to this one striking color was the making of this garden, but a rigid adherence to this rule of one color is the pitfall of beginners who are interested in color gardens. The one color garden generally means a predominance of one color which will carry out a uniform and harmonious effect with bits of other colors to enhance its effect.

A series of color gardens can often be arranged with great effect as parts of one big design. In one I know a white garden acts as an introduction to a garden of bright color. In another the main borders are pink, while in one side garden purple and yellow flowers are blooming around a pool and in another woodsy white flowers are planted amid ferns under tall trees. In the same way the shady front of a summer cottage has a border of white Lilies, Maidenhair ferns, Japanese Anemones and *Clematis* while just around the corner under a sunny south window group there is a pink border of Peonies, *Phlox* and Sedums with Hollyhocks peeping in at the windows.

Color will often emphasize the design of the garden. Delicate blue and white will make a charming centre for a garden of strong yellows, orange and reds and a pink centre will be lovely for a garden of blue, yellow and white.

Most interesting are the color sequences carried out in the same garden. Each color is used in distinct masses and then partly interplanted with the next so that each color will melt into its neighbor until they are blended and wrought into a subtle harmony.

This may be easiest explained by the use of one kind of flower. I worked out such a sequence in Irises. The garden was roughly horse shoe in shape. At the entrance the rose pink of "Her Majesty" and the rose lilac of "Queen of May" began the color sequence. Next came the clear white of "Innocence," then the white "Delicatissima" and "Madam Chereau" which is white with frills of delicate blue, then came



INTERPLANTING OF PINK FLOWERS
IN NARROW BORDER, GARDEN OF
MRS. BERTRAM H. BORDEN
OCEANIC, NEW JERSEY

the lavender blue *pallida dalmatica*, then the purple of Othello and Purple King, next a yellow one with lilac frills, then creamy flavescens and the clear yellow *aurea* then the coppery crimson and maroon of the exquisite *Jacquiniana*. For such a sequence to be successful the different kinds must be used in sufficient quantity to be telling, twenty to thirty of a kind. For a small garden it is better to use either one telling and interesting variety by itself or several that will harmonize.

For color sequences each color section must provide that color for each season. Take a sequence of pink, white, blue, orange, yellow, and purple. In May, pink ground *Phlox*, Bleeding Heart, white *Iberis* and *Arabis*, Forget-me-nots, Blue Flax and the lovely blue *Polemonium reptans*, Golden Tuft and yellow Doronicums, lilac *Phlox* and purple Rock Cress will carry out the sequence, while in September pink and white *Lilium speciosum*, steel blue autumn Salvias, orange and yellow Marigolds, and purple Asters will carry along the same color sequence.

It is when one color merges into another that the wonderful effects are often attained of which each garden is so proud. In March the delicate purple *Iris reticulata* is blooming with white crocuses, in May *Iris pumila* is flowering with the yellow Daffodil Emperor; later pink Tulips stand before the early florentine Iris, in June white Lupines, golden yellow Iris and purple *Nepeta* are out together, in July Japanese *Iris* form a background for Water Lilies, in September autumn Crocuses form ground covers for shell pink Anemones and white Anemones are planted with pinkish Asters, in October the lavender flowers of *Cobaea scandens* are wreathed in the changing colors of the grape vine. In such rhythmic harmonies and subtle contrasts is the master hand distinguished in flower arrangement.



POOL KEPT GREEN AND WHITE
UNDER SHADE OF TALL TREES.
MRS. M. W. DODGE
MT. KISCO, NEW YORK

Vegetation of Korea

By E. H. Wilson



THE Diamond Mountains have for many centuries been a Buddhist sanctuary and in consequence the forests have been preserved so one finds there most of the plants known to grow in central and north Korea, also a few peculiar to these mountains. The Mongolian Oak, several species of Birch and of Maple with such conifers as *Pinus densiflora*, *P. koraiensis*, *Abies holohylla*, *A. nephrolepis*, and *Picea jezoensis* are the principal and most common trees. At one time the conifers dominated the forests but broad-leaved trees are now in the ascendancy and the changing character of the forests is very marked. The mountain slopes are very steep but, except where absolutely sheer, are clothed with a dense mass of green vegetation. The chief element of the undergrowth is *Rhododendron Schlippenbachii* and in early summer its pure pink blossoms must make a wonderful display. We ought to plant a big patch of this species in the Arboretum for it is one of the most beautiful and most hardy of all Azaleas. It is strange that as good a plant should be almost unknown in western gardens. In flower the most common bush was *Magnolia parviflora* and with its pure white blossoms was wonderfully attractive. It loves rocky places and I feel sure it would thrive in our woodlands. This year I shall strive to get plenty of seeds of this plant.

The trees and shrubs here are fruiting most freely this year, and none more so than the Korean Nut Pine whose heavy

* In the JOURNAL for March, 1918, Mr. Wilson made some notes on the plants of the Diamond Mountains. These further observations on plants of that region are taken from a recent letter to Professor Sargent and sent to the JOURNAL by him.—ED.

cones in clusters bend down the branches. Under stress of weather these branches frequently snap and this explains how the characteristic crown of this tree is formed. The *Abies nephrolepis* with a wealth of violet-blue cones was a wonderful sight and I was fortunate enough to discover a form with pure green cones. This differs from the type in no other particular and is quite common in the places I found it. I also got material of a green-coned form of the Korean Larch from trees planted in monastery grounds. Unfortunately the history of these trees is unknown. They must have been brought from the north for in Korea Larch only grows on volcanic soils and none is found on the Diamond Mountains which are composed of granite. I saw plenty of the *Thuja* (of which last year I sent you much material) and think it likely to prove a most useful addition to our hardy low-growing conifers.

I gathered flowering specimens of Nokni's new genus *Pentactina* which is related to *Spiraea* and very interesting botanically though not ornamental. It is a low plant and is confined to steep cliffs. The new *Forsythia* I sent last year is a very distinct species even though the flowers are unknown. It is common on the Diamond Mountains. *Pyrus ussuriensis* is abundant and this year is laden with fruit. On some trees the fruit is wholly green, on others reddish on one side; the length of the peduncle varies and the same is true of the leaf structure; the calyx is persistent or deciduous often on fruits on the same branch. In monastery grounds an Apple is cultivated; it seems to be the same as that of interior China.

In all I collected material of about one hundred-forty species of woody plants and took three dozen photographs.

An Autumn Blooming Iris

By B. Y. Morrison



SINCE writing the recent notes for the JOURNAL there has flowered in my garden another *Iris* which commands attention on account of its unusual flowering season as well as for its distinctive appearance. This is *Iris dichotoma*

I first saw the *Iris* blooming in the meadows at The Western Tombs, some ninety-odd miles northwest from Peking. The best plants were in the flat bottoms, near the broad wash where a stream raced through in the time of spring freshets, but there were scattered individual plants through the grass even up on the higher ridges under the trees of the temple groves. These latter plants were of far less vigorous growth, and the branching flower stalks bore fewer flowers. As it was the fourth of October the blooming season was nearly over and the seed pods of the first blossoms had reached mature size although they were not ripe. I collected a few plants which I sent to my headquarters in Japan. These did not survive the journey, as the roots were few and the time of moving was not the best.

The plants which I have now are from seed kindly sent me by my host, Dr. Meng, who gathered the seed later in the year and sent it by post. It reached me in late February, 1917, and was planted at once. In the dry soil of my garden the plants made small growth during that season but came safely through the severe winter of 1917 and this year bloomed freely. The first flowers opened on August 15, and the last came about the 20th of September. Some seed sent to a friend near Boston, made much better growth and several plants started to throw flower stalks the first year but were caught by the frost before maturing. All the Boston plants were lost in the winter of 1917.



IRIS DICHOTOMA
AUTUMN FLOWERING

The plant forms a broad fan of vividly yellow green leaves from which rises the tall widely branching stalk. The drawing was made from a small plant gathered in China. Many flowers are borne in each of the heads which as well as the individual bloom lasts but a few hours. In China they opened about two o'clock and lasted till sundown, but here they delayed their opening until four o'clock by our war-time reading of the clock. On one of the stalks there were one hundred and twenty-six blooms. These flowers are small as compared to most *Iris*. The color is commonly a dull ivory white flushed with gold in the throat and speckled and blotched with purple which becomes chocolate when it is on the gold ground. I believe that all purple flowers have been reported. I did not see any and none of my seedlings have shown that variation. They have shown wide range in the amount of spotting and one flowered a pure white with only the flush of yellow in the throat.

I cannot believe that they will make a great addition to our garden flora for the flowers are not sufficiently showy, but for the person who likes the unusual, the autumn flowers show quite enough of intimate beauty to make up for any lack of size or brilliant color. There is in addition a faint but very delightful perfume. Whether the plants will prove perennial or not in this country, I do not know. Mr. Dykes writes that in England the plants are often so exhausted from the profuse blooming that they do not survive. In any case the seedlings are so easily raised that there should never be any difficulty in keeping the plant.

Plant Immigrants

The office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry publishes a list, under the above name, of recently imported plants, many of which are valuable to the gardener, from a decorative or economic standpoint. Through the courtesy of Mr. David Fairchild, who is in charge of this work, we are enabled to reprint notes on such plants as have particular interest to our readers. To all who can demonstrate their fitness to care for these recent introductions, the office of Foreign Seed and Plant Introduction will send what is available. Recipients of such material, which often requires considerable skill in handling, obligate themselves to report, when requested, as to what the result of their observations has been. It is essential that the numbers assigned by the Office should be firmly attached to the plant. By this the government gets data on hardiness of the new introductions, and the growers have an opportunity for the observation, first hand, of plants that may prove important. Applications for or letters about these plants should not be sent to the Editor but to Mr. David Fairchild, Office of Foreign Seed and Plant Introduction, Bureau of Plant Industry, Washington, D. C.



BERBERIS WILSONAE × *AGGREGATA*, 45-, 477. Hybrid barberry. From Bell, Maryland. Presented by Dr. W. Van Fleet, of this Bureau. "Hybrids of *Berberis wilsonae* and *B. aggregata* grown from seeds secured by pollination under glass in May, 1914. Both species are late bloomers when grown outside. *B. aggregata*, the pollen parent, is an upright grower with larger foliage than *B. wilsonae* and very showy flower clusters. The hybrids, however, are even more spreading in growth than *B. wilsonae* with very thickset foliage that turns deep purple at the approach of frost and holds on until midwinter. All the hybrids are quite uniform in appearance and are very handsome and hardy. Flowers and fruits have not yet appeared on these seedlings."

CORYLUS COLURNA, 45347. Turkish hazelnut. This is from Rochester, New York. Presented by Mr. John Dunbar, Assistant Superintendent of Parks, through Mr. C. A. Reed, of this Bureau. "The plants from which these nuts were

obtained came from L. Spath, Berlin, Germany, twenty-five years ago. They began to bear fruit about six years ago. The trees are now about twenty-five feet tall. It took these nuts two years to germinate." (Dunbar.) The tree is well worth growing for its stately form, so remarkable for a hazel, and for its curiously enveloped nuts. Native of southeastern Europe and Asia Minor; introduced into England about the middle of the seventeenth century.

LILIUM RUBELLUM, 45322. Lily. From Manchester, England. Presented by Mr. I. Henry Watson. This fine lily is nearest to *L. japonicum* (*L. Krameri*), from which it differs by its broad *speciosum*-like leaves and smaller pink flowers with obtuse segments. The build is similar to that of *L. japonicum* but more oval in shape; stem 1 to 2 feet high, smooth, green-spotted and tinged with purple, lower part bare of leaves; leaves 15 to 20, horizontal, 4 to 5 inches long, $\frac{3}{4}$ to 1 inch wide, flowers 1 to 8, 3 to 4 inches long and as wide, fragrant, of the same color variations as *L. japonicum*, anthers yellow or orange. June to early July. Native of Japan. Allied to *L. japonicum* but possesses a better constitution, being rather more robust and permanent.

CASTANEA CRENATA, 45334. Chestnut. From Bell, Maryland. Presented by Dr. W. Van Fleet, of this Bureau. Bell No. 1. Fourth generation by straight selection. Started by a variety cross between two early, prolific types of *C. crenata*. Very large nut, with good cooking qualities, but poor eating qualities when raw. The tree has a good habit, with thin, handsome branches. The trunk is clean and bright. Leaves very narrow. Dr. Van Fleet has about 40 trees of this selection.

CASTANEA CRENATA, 45337. Chestnut. From Bell, Maryland. Presented by Dr. W. Van Fleet, of this Bureau. Bell No. 4. Fourth generation by selection. The trees have very much the same habit as S. P. I. No. 45334, 45335 and 45336, and the nuts are about the same size—very large. The nuts have good eating qualities, and are better than those of the numbers referred to above. This number is eminently worthy of propagation and dissemination.

ACTINIDIA CHINENSIS, 45588. Yang tao. From Krling, China. Presented by Rev. John Berkin. The Yang tao, as this deciduous climber is known in Szechwan province, where it is native, has attracted considerable attention from travelers and missionaries in China, because of the high quality of its fruits, and the ornamental value of the plant. Single plants often grow 30 feet in length so that the vine will cover large areas of trellis. The leaves have a plush-like texture, and an unusual dark-green color. The young shoots are bright pink and villous-pubescent. The size and regular spacing of the leaves make this climber valuable where large areas of foliage are desired. The flowers are buff-yellow to white, fragrant, and of large size, being from 1 to $1\frac{1}{2}$ inches in diameter. The abundance of these flowers adds greatly to the beauty of this plant, and enhances its value as an ornamental. The following account of the fruit was written by Mr. Wilson while in China. "Fruits abundantly produced, ovoid to globose, 1 to $2\frac{1}{2}$ inches long, 1 to $1\frac{1}{4}$ inches across; epicarp membranous, russet-brown, more or less clothed with villous hairs. Flesh green, of most excellent flavor, to my palate akin to that of the gooseberry, but tempered with a flavor peculiarly its own. The fruit is excellent when fresh, and also makes very fine jam and sauce. A number of the Yang tao fruits which were produced by vines growing in California were shipped to Washington and have been eaten by a number of people of discriminating taste, and the universal opinion appears to be that we have in this Chinese fruit a distinct new possibility for home gardens in Southern regions. What American horticulturists will do with it remains to be seen. It is now essentially a wild fruit, for the Chinese have done no more with it than Americans have with their largest wild fruit, the papaw (*Asimina triloba*). While this plant is not hardy in regions of severe winters, the rapid growth in the spring will make it a valuable ornamental, even in those regions where it is killed to the ground each winter."

LILIUM PHILIPPINENSE, 45570. Benguet lily. From Manila, P. I. Presented by Mr. Adn. Hernandez, Director, Bureau of

Agriculture. "This new white trumpet lily seems destined to become of very great value to both private and commercial growers. The short time necessary to flower it after potting surprises all who are growing it for the first time. We found last year that it was all the introducers claimed for it, and from a batch of small bulbs potted September 8 we cut flowers December 3 of this year. These bulbs were grown in a cold-frame for nearly half that period or they would have flowered earlier. The long, pure white, sweet-scented flowers arrange beautifully in vases. The stems are sufficiently strong, without being too rigid, as is the case with other forcing lilies, and the foliage is so much more graceful than that of other lilies that any flower lover would not hesitate a moment which variety to select when both were purchasable. For floral designs this lily is superior to any other white variety and we fully expect it will in a few years be as much a market necessity as *Harrisii* and *longiflorum* now are. Six or seven bulbs may be grown in a 6-inch pot or pan and a dozen or more in an 8-inch pan for good effect."

PTEROCARYA STENOPTERA, 45587. From China. Collected by Mr. Frank N. Meyer, Agricultural Explorer for this Department. "(No. 2447a. Kingmen, Hupeh, China. September 5, 1917.) An ornamental tree belonging to the walnut family, growing to a large size. The foliage is pinnated and of fresh green color. In early spring, before the leaves are out, the trees are loaded with long greenish brown, staminate catkins, which give them a festive appearance; these are followed by racemes of small winged fruits which persist on the trees until September. The young foliage is covered with small yellow-brown glands and when rubbed smells like sour apples. The trees love moist situations, especially near running water and in porous soil; however, they also thrive on dry fields, but do not grow so fast nor so large as when near water. It is one of the best flowering trees in the Foreign concessions at Hankow and Shanghai and is called by foreigners the 'Chinese ash' on account of its resemblance to a *Fraxinus*. Chinese name Maliu shu, meaning 'Fiber willow tree,' often abbreviated to

liu shu. This is a very promising shade tree for streets, parks and gardens in those sections of the United States where the summers are moist and warm and the winters but moderately cold. It does well where rice and cotton mature fully, and where the large-leaved privet (*Ligustrum lucidum* Ait.) and the tea-olive (*Osmanthus fragrans* Lour.) remain out-of-doors the year round." (Meyer.)

Book Reviews

An Introduction to the Study of Landscape Design. By HENRY VINCENT HUBBARD AND THEODORA KIMBALL. (Quarto. Pp. 406 + 40 drawings + 36 photographs. Macmillan Company, New¹ York., \$6.00.)

If certain publications may be said not to need criticism, but appreciation, then this book on landscape design, whose authors are associated with the school of landscape architecture at Harvard, emphatically comes under that category.

Landscape design, like any other, must be based on good taste, which the authors have sought to guide and develop through a series of chapters that must be indispensable to students and could be read with profit by many practitioners of the art. While the authors are under no illusions as to the difficulty of "managing" certain clients, or of creating designs to fit often burdensome restrictions, they stand, without equivocation, for the only ideals that can be worth following in such a profession.

Some popular misconceptions regarding formal and naturalistic designs are pretty thoroughly exploded by the book, which insists that design in landscape architecture to be good, must fit the mode of life, the *genre* of the civilization to which it is to be applied. Notorious cases where this has not been done, where mere love of invention has run riot, as in Germany, leads to work that "seems to most non-Germans,—and to some of the Germans themselves—grotesque, or childish, or at best crude."

Contrasted with this, whether it be a garden of a colonist in New England, a cottage on the Thames, or the palace garden at Versailles, there is fitness, and, that indefinable atmosphere of taste so difficult to attain, so instantly recognizable by the discerning, and often somewhat wearisome to the obtuse.

Because it stresses so much questions of style and taste and ideals, which must be the foundation of any art, it should not go unrecorded that the volume, for over two hundred pages, is practically a textbook of how these ends are to be accomplished. It is perhaps curious that there is very little said about the plant materials which bulk so large in the treatment of any design, and it is probably omitted as being coin of the realm to those who use the book. Many pictures and over thirty fullpage photographs help materially in illustrating this really notable volume on Landscape Design.—N. T.

Genetics in Relation to Agriculture. By E. B. BABCOCK AND R. E. CLAUSEN (650 pages; 239 illus., McGraw-Hill Book Company, Inc. 239 West 39th St., New York. 1918. Price \$3.50.)

This is a textbook on genetics which is attracting the attention of teachers of this subject and others who are looking for the principles of breeding and their application to plants and animals.

Many of us have regarded genetics as a one-sided subject dealing merely with some phase of plant breeding, whereas it seems to be many sided and demands a wide knowledge of botany, chemistry, mathematics, physics and an appalling number of other subjects. Indeed the scope is so large that it is rapidly becoming the source of information for the eugenist and the sociologist as well as the practical agriculturist, the animal breeder and the plant breeder.

It will interest nurserymen and horticulturists because a thoughtful perusal of its pages will begin to clear up many obscure points and lead to scientific investigation instead of accepting as truth those things which have been handed down by hearsay from remote antiquity,—the sources of which were often witchcraft and astrology.

This is a book that all garden lovers should read since it will enlarge their outlook and broaden their sympathies with plant life. The chapters especially valuable for their use are: Varieties in Plants, Selection, Hybridization, Graft Hybrids and other Chimeras.

It is invaluable to the plant breeder since it shows him the great possibilities that may still be realized and points out some of the difficulties of the past and how and where these same dangers may be avoided in the future.

To the busy man who wishes to keep abreast of the times it affords an insight into the subject without too greatly taxing his time and his strength. It is not feasible for such a man to follow into the minutest detail every scientific subject but he can read the conclusions and follow the methods whereby they have been reached.

Such a book as *Genetics in Relation to Agriculture* is valuable to us all because it shows the problems on hand and the approximate results up to date.—KATHERINE D. JONES.

The Food Producing Garden. BY HARRY A. DAY, F.R.H.S. (Methuen and Company, Ltd., London, pp. 98. Two shillings net.)

A book which sets out to tell how “to organize the garden with a view to food production without destroying its pleasurable features.” The

size of the garden that the author has in mind averages "somewhere between fifty feet to two hundred feet in length, and from fifteen to twenty-five feet in width." The book deals with the organization of space and soil, of time and labor, the utilization of waste materials, and with allotment gardening which is something practically unknown in this country. Flower, vegetable, and fruit gardens receive attention, with a chapter on the garden under glass. The place of live-stock, such as bees, poultry, ducks, rabbits, pigs, and goats in the food producing garden is discussed together with hints on their management.

The value of the book is lessened because of the attempt to cover too much ground in so small a volume; obviously with such a multiplicity of subjects, details are frequently lacking. Although written primarily to meet British conditions, American readers will find much that is suggestive.—MONTAGUE FREE.

Winter Botany. By PROFESSOR WILLIAM TRELEASE. (394 pp., published by the author, Urbana, Ill. 1918. Price \$2.50.)

In the JOURNAL that appeared a year ago the book to which this is a companion volume was reviewed. The first book was adapted to all those who used plants as materials for gardens, because it aided one in the determination of them. This latest volume has a still wider field of usefulness in that it gives the winter character of hundreds of shrubs and trees, with keys for their identification when the leaves are lacking. For boy-scout instructors, nurserymen, gardeners, and others who must use plants in their dormant condition this little book, which fits the pocket, will be invaluable. To those who find much that is interesting about shrubs and trees during winter walks in the park or woods, these keys which Professor Trelease has prepared with so much patience will be of the greatest use. Those desiring the book should write to Professor William Trelease, University of Illinois, Urbana, Ill.—N. T.

Commercial Plant Propagation. By ALFRED C. HOTTES. (180 pp. 105 illustrations. A. T. De La Mare Company, Inc. New York. 1918. Price \$1.35.)

This book is a handy little primer on the subject of Plant Propagation. It is not confined in scope to a discussion of the methods followed by commercial growers, as might be supposed from the title, but is a summary of the various practices pertaining to plant propagation generally. Experienced practitioners will be inclined to question the statement that "If we

were clever enough any portion of a plant should produce a new individual." This can truly be said of a few plants, but the inherent character of most plants must undergo some change before any portion of any plant becomes capable of producing a new one. Annuals being defined as "Plants which make their entire growth in one season," it was evidently an oversight to include Beet, Parsley and several other biennials under that heading.

Lists showing the approximate longevity of various seeds and length of time required for germination convey information often asked for.—H. ERNEST DOWNER.

Diseases of Truck Crops and their Control. By J. J. TAUBENHAUS. (Pp. XXI + 396; 72 figures. New York, E. P. Dutton and Company, 1918. Price \$5.00.)

This is the second book in the series of four plant disease books promised by the author, who is the plant pathologist and physiologist of the Texas Agricultural Experiment Station. The present book is intended primarily to summarize for the truck-grower the present state of our knowledge concerning the diseases which cause his losses, as well as to stimulate more research on these problems among plant pathologists. The book will undoubtedly be found useful for both purposes.

Part III is arranged quite conveniently, the crops being grouped into families and the specific diseases discussed for each. In the treatment of the more important diseases the *symptoms*, the characteristics of *the organism*, and *control* measures are discussed. This arrangement should make it easy for the truck-grower to find and to remedy his trouble.—E. W. OLIVE.

Notes and News

In the September issue of the JOURNAL appeared an account (p. 450) of the proposed restriction of the importation of nursery stock by the Federal Horticultural Board. The result of that conference on May 28th, where the opposition to the proposed action was emphatic, was that the Board issued notice of another hearing, held on October 18th. The regulations considered then were, if anything, more drastic than the previous ones, so far as they apply to ornamental shrubs and trees, particularly those coming with balls of earth around them (Rhododendrons, Azaleas, Evergreens, etc.). Such shrubs and trees, under the new regulations, would have been excluded from this country after July 1, 1919 instead of January 1, 1923, as the old regulations proposed.

The holding of this second hearing was unnecessary according to the Chairman's remarks at the opening of it, because the hearing on May 28 had technically complied with the law and the Board could then "legally go ahead and declare whatever quarantine or restrictions it saw fit to promulgate."

The International Garden Club protested vigorously, through the editor of the JOURNAL, to this action and in the following words stated its reasons for so doing.

The International Garden Club, consisting of hundreds of garden and estate owners opposes any action of the Federal Horticultural Board that, because of becoming effective too soon, will prevent such adjustments of the nursery business, as will permit an uninterrupted supply of Rhododendrons, Azaleas, evergreens or other stock. If restrictions to importation are to be imposed by the Board the Club urges that they be of such character that American nurserymen and florists can have time to propagate sufficient home grown stock to supply such deficiency as the Board's action may, by exclusion, create.

In addition to this the Club was instrumental in arousing opposition to the scheme on the part of the Ridgewood Garden Club and the Society of Landscape Architects, besides many individuals. In a letter printed in the New York *Evening Post* on October 28th, further impetus to the opposition was given. We quote it herewith.

To the Editor of The Evening Post:

SIR: The Federal Horticultural Board soon takes final action to stop the importation of nursery stock into this country. Practically all ornamental shrubs and trees will be

excluded after July 1, 1919, if the Board carries through its programme. Because the extent of this importation and what will follow its too sudden stoppage are not fully realized, I beg a little space to protest against the proposed scheme.

Ninety per cent of the ornamental shrubs and trees in American gardens were imported in the young state from Holland, Belgium, and France. Because of the possibility of introducing pests, the Board proposes to stop such importations. This may, in the opinion of the Board, warrant the drastic measures proposed, but until American nurserymen, who have vainly protested, are in a position to propagate their own stock, the supply should not be cut off. It would take at least five years for the nurseries to accommodate themselves to this action and they are willing to do it, as there is no question of the Board's competency. It is merely a question of making haste slowly.

Every owner of a country place or others interested in maintaining the beauty of American landscapes should send word at once that they are opposed to any action that will bring about such a condition as is outlined in the preceding paragraph. Letters or telegrams should be sent to Dr. C. L. Marlatt, chairman, Federal Horticultural Board, Washington, D. C.

The exclusion of shrubs and trees from France and Belgium may, just at this juncture, be open to an interpretation by our Allies that, while not true, seems to me is to be avoided. Is it not possible that the Board, in its zeal to protect us from pests, has proposed something for which neither we nor our Allies are quite ready?

NORMAN TAYLOR,

Editor International Garden Club Journal.

In addition practically all the commercial firms in the country objected to the proposed action of the Board and it looks at the present writing (November 27) as though there might be at least a postponement of whatever action the Board may think necessary. It may even be that they will reconsider the matter again. It appears that until importations are normal, any prevention or exclusion will work great injury upon the nurseryman as well as upon the ultimate consumer who is interested solely from the esthetic side.

Another phase of the matter is that neither Canada nor Mexico have passed such legislation, and that nothing done here will really exclude pests from the United States, so long as possibly infected stock can still be imported to the north and south of us. Upon this ground the Western New York Horticultural Society has gone on record as opposed to the bill.

The Dewberry

This is popular in many sections because it ripens earlier than the Blackberry, which it resembles. It will grow in almost any fertile soil which is not too wet. The hill system and the solid row system of planting are used, and when plants are established, new ones can be obtained by covering the tips of the young canes with a few inches of soil in the late summer or early fall.—S. M. BEER.

Artemisia lactiflora

This plant is comparatively new to our gardens, and is one of the many fine things introduced from China by Mr. Wilson. It has proved a great acquisition to the herbaceous border not only for the beauty of the individual plant, but for the length of time it remains in bloom. From early in August, until the end of September, its elegantly cut foliage terminating in light and graceful panicles of creamy white flowers, reminds one of the old *Spiræa Aruncus*.

I consider it one of the most attractive and desirable plants for the garden when used for grouping, or as "foils" when planting for colour effect.

Planted as a background for *Tritoma Pfitzerii*, or late Phlox, Zinnias etc., the feathery plumes make a fine contrast to the more stiff plants, and tend to maintain the proper balance. It grows from $4\frac{1}{2}$ to $5\frac{1}{2}$ feet high.

It is easily propagated by divisions which can be done in the Fall or Spring, personally I prefer Spring.

This plant is presumably hardy, but of course it depends to a great extent on the position, and the exposure it may be subjected to. It often happens after sudden thaws, when robbed of nature's blanket of snow, the temperature may fall to zero; then if caught without adequate protection, it is often fatal to the green foliage. Therefore, I would advise removal in the fall to sheltered quarters. These little attentions well repay the little trouble taken. When used for cutting it makes a fascinating decoration, especially if used with such subjects as the long spikes of *Delphinium*—It is easy of culture doing well in ordinary garden soil.—SAMUEL GOLDING.

Growing Dahlias from Seed

Any one that owns a frame deep enough to make a hot-bed can grow Dahlias from seed. These should be sown the latter part of March or the beginning of April. Seed should be sown in light soil, say 1 part leaf mould to 1 part loam with a sprinkle of sand. Do not water the seed too much until they have made a good start; and as Dahlia seed germinate very irregularly, do not discard the pan after getting the first lot of seedlings as some will not make an appearance for several weeks. When the seedlings are large enough to handle transplant them into a box or better still 3 or 4 inch pots. When they get to be 4 inches high transplant again. In other words keep them moving, using the same compost; when danger of frost is over gradually harden them off, and by the first week in June a little tuber will be seen, when they should be planted out. Select an open

spot (never plant Dahlias against buildings, walls or under trees), using not too rich a soil, since then they will make too much wood. In planting. put in your stakes first, 3 feet. each way, then put in your plants. Grow them on one stem only and when they get to be almost two feet high trim all the side shoots to a foot from the ground, to insure good cultivation which should be done thoroughly to keep the weeds down. During the summer months water twice a week and as the flowering season approaches, which is September and October, give them liquid manure once a week. I have had larger blooms from seedling than from old tubers, some of the Peony type measuring 8 inches across with a 3 ft. stem without dis-budding them or disfiguring the plant. It is a pleasure to see the most charming and delicate colors develop now that the Dahlia has been brought to such perfection. In order to secure large blooms disbud all small and defective buds.—T. L. HUGHES.

Those who wish to bind the volume of the JOURNAL completed with this issue, will please notify the editor before March 1, 1919. About that time Table of Contents and Title Page for this volume will be sent to all who have applied for it.

Address Norman Taylor
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Journal of the



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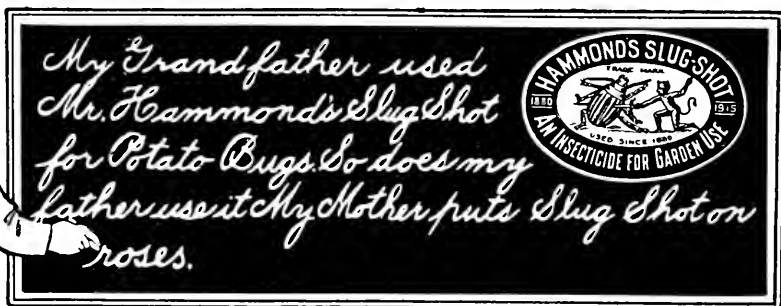
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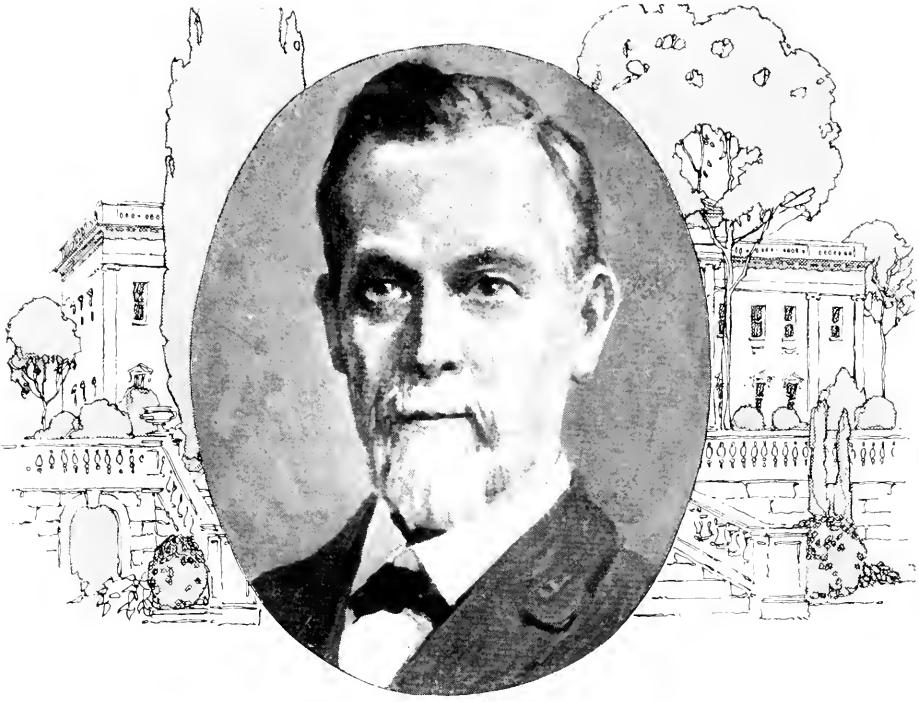
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